THE IRON AGE

New York, January 24, 1924

ESTABLISHED 1855 VOL. 113, No. 4

Progress in Industrial Relations

Important Gains Made by Progressive Corporations—Employee Representation Has Accomplished Much, But Has Not Been Perfected

BY CHARLES M. MILLS

THE end of 1923 and the arrival of the new year have marked an unusual industrial situation. For the first time in several years, there are no large strikes or important industrial disturbances in the nation. We have passed successively through the rush of war-time production and inflation with attendant strikes and upheavals; and a depression and deflation period of layoffs and unemployment. The last year has been an era of steadiness in production, prices and general industry. In his review of labor conditions in 1923, James J. Davis, Secretary of Labor, said:

"This has been generally a year of industrial peace in this country, probably as peaceful a year in the relations of workers and management in industry as we have ever known. It is gratifying to note the increasing tendency among employers and employees to meet their joint problems and their joint difficulties in the light of their mutual interests. The full development of this tendency is not always tangible, but it is plainly evident to any one who is in daily touch with the industrial life of the country. More and more men and management are settling their disputes by joint negotiation without recourse to strike or lockout. They are cooperating to serve their mutual welfare by preventing suspensions of production and consequent loss to themselves and the public."

Such a statement inspires considerable thought. Is the present industrial peace temporary or permanent? Is the present situation simply a lull before a mighty storm? Have we passed the barriers to industrial peace that defeated us 10, 20 or 30 years ago? Have we gained a finer sense of justice, of square dealing, of sincerity?

Subtle and Invisible Factors

First of all, I believe we should consider the subject in its largest possible aspects; not thinking merely of an improvement in material matters affecting working conditions; not only of the changed economic status of wage-earners; but also of those more subtle and invisible moral qualities that no chart or statistical analysis may portray.

At the very start we are perplexed. We go back 30 or 40 years. We think of the labor riots of the 'eighties. Yes, we say, we have progressed far beyond a Pullman strike or a Haymarket upheaval, but then—what about the West Virginia and Herrin of today? We still seem to have labor conflicts as bitter and as disastrous as in 1889 or 1894 or 1899. Is there a difference between then and now?

Surely in one distinct way we have progressed. We may have as serious industrial trouble as a quarter of a century ago, but at least we have a keener public mind about the matter. We have developed in these years a social conscience far more powerful than in

How and Why Conditions Are Improving

1. *We have a keener social conscience today than ever before which demands knowledge of industrial conditions.*
2. *Our more progressive corporations are realizing that proper industrial relations are akin to public relations, and that, therefore, industrial conditions must be equitable and just.*
3. *Public opinion, centralized in public welfare, demands industrial peace, and no monopoly of either capital or labor can be maintained for any considerable period.*
4. *Physical working conditions have improved vastly during the last 25 or 30 years, and no longer are demands for improvement in these conditions made central issues in labor disturbances.*
5. *Employment methods, training and general treatment of wage-earners have improved greatly, and corporations are realizing today that proper personnel procedure is economically sound as well as socially just.*
6. *The character and development of industrial representation plans are most difficult to analyze; in the short period they have been in existence they promise much in the future development of American industry. We must not expect too much too quickly. The real test will come in the establishment of real collective bargaining.*
7. *To continue to progress in our industrial relations, we must have absolute faith in human nature.*

olden days. Today we want the facts of every important industrial relations question. If a great industrial outbreak occurs anywhere in the nation today, every prominent newspaper and the most reputable journals send their investigators to the scene of action. *One* opinion no longer suffices. Our public conscience demands *all the facts.*

Great Corporations Awakening

Our great corporations are awakening to this situation very rapidly. They are learning that proper industrial relations within their organizations are absolutely necessary if equitable public relations are to be maintained. Only recently an entire board of directors of one of the largest corporations in the country made an extensive tour of thousands of miles so as to make themselves acquainted, not only with their own employees, but also with the public. As the chairman of the board of directors of that company said:

"I had been convinced for a long time that big business so-called, or the management of big corporations, was missing something. I believe in the human element in business; I believe in establishing a personal contact with employees. I do not believe that a board of directors managing a business of any proportions can sit in their offices in New York or Chicago and get that cooperation or have that understanding with their employees that should prevail.

"So I said to my board of directors, 'We are going out to all our division points and we are going to meet face to face and talk with our employees. I want to see them and I want them to see us. I want to tell them what ideals inspire us, what our problems are, and what we are trying to do and what we expect of them.' Every employee who could possibly be spared attended these meetings. The results were wonderful and far exceeded our expectations."

Force of Public Opinion

Because public opinion is keener than ever before, we are led to another conclusion—no single industrial group can threaten the peace of the Nation for any considerable period. A monopoly of labor or capital cannot throttle public opinion nor can a strong faction in either group attempt aggressive tactics that ultimately menace public welfare. In almost any great industrial conflict of today—a coal or a railroad strike, for example—the rights of the public are a central issue. Public opinion, then, demands not only facts, but the maintenance of industrial peace.

Public opinion has also forced us to make progress in another direction. There is no comparison, socially speaking, between working conditions of today and 25 years ago. If you go into almost any plant built within the last ten years, you will find generally excellent working conditions. The regulation of ventilation, the adjustment of light, the guarding of hazardous machinery, the building of adequate toilet and locker room facilities—all these things have come about not only because they were proved economically sound, but because public opinion demanded them. There is seldom a strike of any import today that is based either in whole or in part on unwholesome working conditions. The dark, dank factories of the last century are no more. We have surely progressed in material improvement of physical working conditions.

Selecting the Right Men

In the routine procedure of merely hiring men we have advanced. There are few large plants today that hire "by looking over at the gate." The old days of personal favoritism between the foreman and applicant at the gate have largely disappeared. Management has come to realize that it is far more important to select the right kind of men for the job than to order the proper materials, and it has delegated to experts the selection and the training of men. The average executive has learned that a good man who stays a year on a job is worth much more than two men of mediocre ability who stay six months. Management is coming to realize that the way to make a man stay on the job lies not in good working conditions and wages alone, but in fair treatment.

The absolutist days of the "hard boiled" foreman are numbered. Today, we ask for subordinate leadership in our plant, not through Jack Dempsey methods but through loyalty and common sense. We have come to learn that a man who has been fired out of a job unjustly can cause a loss of $10,000 worth of morale and company loyalty in a community. Of course, we must still "fire" the lazy, the inefficient, the liar, and all the rest of that tribe—all men are by no means perfect, but we have learned that the proper review of just causes and complaints pays. Never was more attention paid than at the present time to the percentage and cost of labor turnover, and the companies that are most carefully analyzing the causes of separations are making the most substantial progress in their industrial relations problems. Whether or no the whole gamut of industrial relations machinery may remain, fundamental personnel procedure in hiring, transferring, placing of employees and compiling of labor records and statistics has been generally accepted by management. *We have improved industrial relations, therefore, by thinking of labor not en masse, but as composed of separate individuals and personalities.*

Industrial Representation Plans

When we come to the field of industrial representation plans, joint conferences, joint councils and other methods by which management has sought to improve contacts with its employees, the analysis of progress is difficult. In the first place, we must ask what the purposes of these various plans have been. Were they simply groups to discuss welfare activities, safety, or the physical side of working conditions; or were they groups of representatives of both management and men set up to discuss the fundamental industrial relations questions such as wages, hours, and complaints and alleged grievances? If we may assume that the latter type of industrial council is meant, we may proceed to a few general reflections.

Oldest Councils Are New

First, it is too short a time to pass judgment upon the success or failure of these organizations. The oldest councils in this country are now 10 years of age. We cannot judge what sort of a man a 10-year-old boy may become; why should we determine what joint councils may be 20, 40 or 100 years from the present? We must let the boy grow up first, and then judge of his manhood.

Secondly, we are dealing with human nature—an element that cannot be charted or dissected. The character of these councils is as varied as the personalities which compose them. We cannot say all men are bad because there are some criminals; nor can we judge all councils by some which have ended in failure.

In the third place, we must not forget that such a human agency as an industrial council may be used for either the most altruist or opportunist ends. The council system must be tried thoroughly, conscientiously, sincerely. An industrial representation plan is not made for a moment, for a period of prosperity or depression; it is created for all time as an integral part of our American industrial system.

I do not believe, for one, that the success of industrial councils depends altogether on the elimination *immediately* of all industrial disturbances. It is a far

healthier sign to see men walk out over an honest difference of opinion than to have a council go peacefully along, but openly sneered at by employees as simply another scheme "to put one over." Direct discussion and even interruption of work are far better than formal acquiescence and hypocrisy.

Real Collective Bargaining

The final test of industrial representation and the shop committee lies in the development of *real collective bargaining*. The man in the ranks must come to feel that he deals with management on essential issues not as an individual or as a single representative with limited powers, but as a delegate with the full strength of the group. Today the average shop council offers a most restricted and mild form of collective bargaining. Few industrial representation plans permit arbitration on disputed questions to go outside of the company. The power of collective bargaining as established by groups of men in different plants of the same company or different industrial plants in the same locality is practically absent. Employees are not generally brought together in large and diversified groups. The opportunity for collective thought and action is absent. In the average shop council plan, the enforcement of demands upon management is confined at best to employees of a single operating unit. A corporation with several plants is practically unaffected by any local situation caused by disagreement between the council or committee and the management. Future progress in industrial representation will come largely in making employees and their delegates feel that they are not sharing in a mere old-ladies sewing circle but in a powerful, vital, red-blooded conference where essential issues are discussed.

Sincerity Required

The origination and institution of industrial representation required large vision, keen insight, and a basic trust in human nature. Without absolute sincerity on both sides there is dismal failure, and such disaster creates a far worse situation than before. What we need is faith, and yet more faith, if we are to make industrial representation an essential feature of American industry. We cannot toy with representation as with a new plaything. We cannot back up council plans half-heartedly or with any ulterior motives and expect success. We cannot expect to revolutionize industrial relations in our plants within one year or five or ten years. To progress we must have *faith*.

In conclusion, then, I believe we have made considerable progress in industrial relations and largely for the reasons summarized on the first page of this article.

CHARLES M. MILLS, the author of this thoughtful paper, has had extended experience with industrial relations work and in the past year traveled many thousands of miles, visiting plants in different parts of the country.

Mr. Mills was born in Cleveland in 1892 and graduated from Amherst College, B. A. cum laude, 1914, receiving his master's degree at Columbia University in 1916. The following year he enlisted and became a first lieutenant of infantry in the World War. On returning from the war he engaged in plant and community surveys and was industrial counsel of the New York Department of Labor 1920 to 1921. He served with the National Industrial Conference Board, as head of the wage research department, 1921 to 1922, and has been industrial counsel with Curtis, Fosdick & Belknap, attorneys, New York, from 1922 to the present time. His work has included the publication of pamphlets and research booklets on wages, house working conditions, benefit associations and industrial representation.

Lead and Zinc in 1923

The mine and refinery output of lead in the United States in 1923 each made a fair gain, and the mine and smelter output of zinc each increased about one-third, according to a statement by C. E. Siebenthal and A. Stoll, of the Department of the Interior's Geological Survey, compiled from reports and estimates by producers and others. Data for the Western States are taken from the advance statements issued by the Geological Survey's Western offices. Statistics of imports and exports for 11 months are taken from the records of the Bureau of Foreign and Domestic Commerce.

The output of soft lead from mines in the Mississippi Valley and the small output from mines in the Eastern States amounted to about 243,000 net tons, and that of argentiferous lead from mines in the Western States amounted to about 291,000 tons, a total of 534,000 tons. The corresponding figures for 1922 were 267,441 tons from the Mississippi Valley and 209,408 tons from the Western States, a total of 476,849 tons.

The recoverable zinc content of ore mined in 1923 was about 623,000 tons, as compared with 472,184 tons in 1922. The output of the Eastern States was about 99,000 tons (75 per cent from New Jersey), that of the Central States about 395,000 tons, and that of the Western States about 129,000 tons, as compared with 94,041, 296,430 and 81,713 tons, respectively, in 1922.

The output of primary domestic desilverized lead in 1923 was about 304,000 tons, of soft lead about 184,000 tons, and of desilverized soft lead about 62,000 tons, making a total output from domestic ores of about 550,000 tons of refined lead, as compared with 468,746 tons in 1922, which was made up of 185,191 tons of desilverized lead, 209,250 tons of soft lead, and 74,305 tons of desilverized soft lead. The output of lead smelted and refined from foreign ore and bullion was about 65,000 tons, as compared with 63,916 tons in 1922. The total lead smelted or refined in the United States was thus about 615,000 tons, as compared with 532,662 tons in 1922. The output of antimonial lead is reported to be about 13,000 tons, as against 8075 tons in 1922.

The output of primary metallic zinc from domestic ores in 1923 was about 485,000 tons and from foreign ores about 2000 tons, a total of 487,000 tons, as compared with 353,274 tons from domestic ores and 1003 tons from foreign ores, a total of 354,277 tons, in 1922. In addition to primary zinc there was an output of about 40,000 tons of redistilled secondary zinc, as compared with 32,988 tons in 1922, making a total supply of distilled zinc and electrolytic zinc in 1923 of about 527,000 tons, of which 145,000 tons was high grade and intermediate, 75,000 tons select and brass special, and 307,000 tons prime Western zinc. The apparent consumption of primary zinc in 1923 was thus about 427,000 tons, as compared with 373,094 tons in 1922 and 203,600 tons in 1921.

ANOTHER USE FOR STEEL

Woven Wire Highway Guard to Absorb Impact of Skidding or Speeding Automobiles

A highway safety guard of woven wire, applying the principle of the aerial life net to prevent embankment, bridge and curve accidents, was announced at the Chicago Good Roads Show in the week of Jan. 14. The woven wire, fabricated to absorb impact, is designed to replace wooden rails, stone walls and cables along highway "danger points." Placed on top of curves, cliffs and at bridge approaches and sides, it is designed to stop skidding or speeding machines that hit it by the stretch of its fabric without destructive impact or serious damage to the car or injury to occupants.

Tests of the guard demonstrated that it is impossible for a machine speeding as high as 45 miles an hour to break through it, according to W. T. Kyle, general manager of the Page Steel & Wire Co., who sponsored it. It was produced by the Page company as the result of two years of highway engineering experiments.

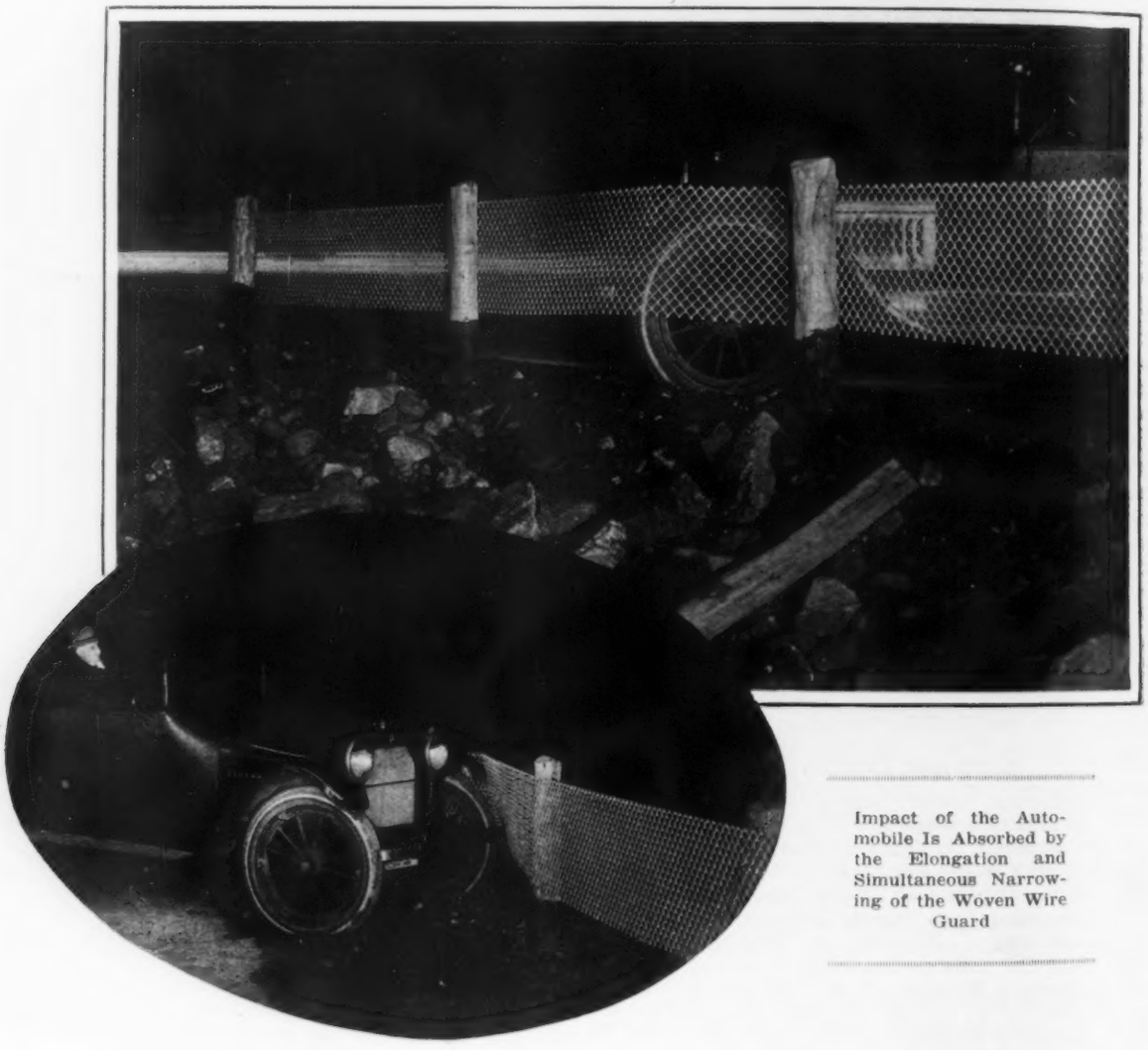
"Forty per cent of highway accidents and many of those in cities result from cars going over cliffs or bridge sides," said Kyle. "The highway guard was built under a method of fabricating wire that would give strength, elasticity and recoil. It has been thoroughly tested under the Underwriters' Laboratory bumper impact test, and also was rammed, as a supplementary test, by automobiles.

"In the Underwriters' Laboratories bumper impact test the guard was stretched between two regulation posts and fastened to each post with ordinary 1½-in. staples. A 650-lb. weight, suspended at a point 68 ft. above its center, was drawn back 30 ft. and allowed to strike, the force being equivalent to that of a 3000-lb. car traveling 20 miles an hour.

"At each of four severe blows the fabric narrowed and elongated, acting in buffer fashion and demonstrating it will stretch until the wires forming the meshes rest against one another. At each blow there was a recoil, diminishing as the guard was pounded, and the shocks were entirely taken up between the two posts.

"In subsequent automobile tests, machines hitting it at moderate speed were brought to a stop, the recoil pulling them back from danger. With the cars going at high speed, the meshes, giving similarly, 'wrapped' around the hood, allowing the blow to spend itself evenly on the wheels, bumper, etc. Even though a blow might displace a post, in such a case the fastenings further away hold and the car is held."

Comparative tests were conducted before Connecticut State highway officials with 4000-lb. machines going 20 miles an hour. The guard was only slightly affected, it is stated, and the cars were not damaged.



Impact of the Automobile Is Absorbed by the Elongation and Simultaneous Narrowing of the Woven Wire Guard

The guard can be installed unbroken for any distance, and if one section is caused to "sag" by a blow, that section can be replaced. Sections on either sides are not damaged. The guard is galvanized and painted white, to make it easily visible at night. It is constructed of 24-in. wire link fabric. The mesh, formed by No. 9 wire, is square and is 1½ x 1½ in.

The Simonds Saw & Steel Co., formerly Simonds Mfg. Co., Fitchburg, Mass., has purchased the three-story building at 127 South Green Street, Chicago, which will be used as a stock room and offices of the company's western sales force.

Economic Progress of Simplification

More Than Five-sixths of the Number of Varieties Formerly Used Have Been Eliminated in Some Industries —Personal Style Matters a Separate Problem

BY E. W. MC CULLOUGH

NEARLY three years of organized effort have been concentrated upon waste in industry, as revealed by the investigation instigated by Secretary of Commerce Hoover and developed by the Federated American Engineering Societies. Activities were launched almost simultaneously and cooperatively by the Fabricated Production Department of the Chamber of Commerce of the United States, the Division of Simplified Practice of the Department of Commerce, the American Engineering Standards Committee, and with the sympathetic cooperation of engineering organizations in general, technical journals and trade association periodicals. The three agencies mentioned planned their joint efforts so as not to overlap, so that, during the period mentioned between 300 and 400 commodity lines have received attention.

It was first necessary to arouse each class of industry to the fact that waste actually existed. This was accomplished largely through transmitting to them the experiences of other lines. Then a committee or "key man" was found to undertake the making of a survey or analysis of conditions. In due time the forthcoming report gave enough of a cross-section of the industry to indicate that further activities were justified.

Help of Trade Associations

It was found, where lines had formed trade associations, that the work not only of organizing investigations, but giving continuity to this undertaking, progressed more rapidly and satisfactorily. The secretaries of these organizations soon caught a vision of the possibilities of worth-while economies and cooperated splendidly in carrying such projects through to consummation.

From the beginning it was made clear to the industries that none of the cooperating agencies mentioned had any arbitrary power, but simply were offering their helpful services in the elimination of wasteful varieties and practices. Even the invitations of the Secretary of Commerce that members of an industry come to Washington for a conference meant nothing more than offering them facilities to serve their own best interests and the public as well. It was only after these relations were understood by industry that real interest was aroused and progress made.

While most lines approached readily admitted that too many variations of sizes, styles and kinds were being produced, it was quite another thing to bring about unanimity of views as to what should be dropped and what retained. Here also arose the usual clash between the sales and manufacturing departments, and in not a few instances was it necessary to retain many more variations than the situation warranted; but the wisdom of "making haste slowly" was duly appreciated.

Progress Has Been Gradual

There were notable instances of this in the clay products lines, where certain sizes and kinds of brick were continued for a year or two, notwithstanding they were not needed; yet certain conditions in the selling field seemed to justify holding them for a time. In fact, narrow self-interest has been the greatest hindrance to progress in most lines and, while the responsibility has frequently been thrown upon the consumer, the burden of proof in most instances should rest upon the producers.

Standardization, closely linked with simplification, has in no small way also hindered the movement, especially through its being wilfully misinterpreted by writers for the public press. It has been charged that many important commodities were being reduced by hard and fast processes to standards so rigid as to eliminate the possibility of freedom of choice by the purchaser. Claims are also made that this effort would tend to kill initiative and bar the progress of inventive

E. W. MC CULLOUGH

E. W. McCULLOUGH while a young man made a connection with a small plant in Illinois which distributed its products throughout the Central West, Southwest and Pacific Coast. He served this concern in various capacities in factory, office and management until, in 1904, he was called by the farm wagon industry to reorganize their trade association. He was secretary and manager until 1910, during which time he initiated their efforts in cost accounting and simplification of varieties, etc. The reduction of wagon wheel heights from 41 to 3 was practically accomplished during this connection, as also were many other standards, and the establishment of grading and inspection rules for wagon wood stock. These were the first rules established and recognized by both the mills and factories.

In 1910 he assisted in the consolidation of the National Plow Association, National Association of Agricultural Implement Manufacturers and the National Wagon Manufacturers' Association, forming the National Implement and Vehicle Association, of which he became secretary and general manager. This organization represented 92½ per cent of the country's production of farm operating equipment and rendered much service during the war. He resigned in 1918 and joined the Chamber of Commerce of the United States in its new effort better to serve business, becoming manager of the Department for Service to Manufacturers.

Mr. McCullough is considered an authority on trade association organization and work and is in constant contact with their activities. He is closely associated with Secretary Hoover's work of simplification and standardization, being a member of his planning committee; also his committee now constructing a dictionary of commodity specifications for federal, state and municipal purchasing.

genius. All of this is not only erroneous, but to a degree malicious in checking many worth-while savings, where credence has been given to such statements, especially when emanating from seeming high authority.

If simplification means anything, its operation clears the path for inventive genius and improvement, reducing as it does the volume of dead or slow-moving stocks of both materials and finished products. It is a step also in the direction of learning what the consumer's real needs are and through efficient production, satisfying those needs at the lowest possible cost.

It would seem that this whole effort should have been unnecessary, and that it really reflects discredit upon those engaged in industrial management and direction, because these elements of waste, since attention has been directed upon them, are so self-evident in many lines. But a more careful examination of the situation exposes the fact that, in conducting a manufacturing plant in such a manner as to give its selling agencies the greatest possible liberty in securing business, it was not possible always to eliminate the obviously unnecessary, at least when first apparent.

The Shibboleth of "Service"

For several years prior to the war, "service" was a common trade slogan and most industries went far in satisfying the consumer, so much so that factories began to degenerate into made-to-order shops and, to account for the extra expense heaped up in increased production costs and overhead, new activities were created to pass this burden on to the consumer. This wonderful service was continually dinned into his ears to drown any protest against increasing prices.

This lasted until the post-war boom, when price for a time was lost sight of in the anxiety due to the belief, created with little foundation, that there was a tremendous shortage of all commodities. We are just now emerging from this confusion and are beginning to realize that the consumer is "gun shy," fearing neither possible shortage nor that present prices will be greatly enhanced, but rather looking anxiously and continuously for indications of economies as forerunners of lower prices.

The solution of these waste studies through simplification and standardization has been largely in lines other than those involving the element of style—that is, in particular, those related to personal wear. Lines which consume largely iron, steel and most of the metals received early attention, and with them might be listed clay products and ceramics generally, paper, wood products and many composite lines closely allied to them. The explanation for this rests largely in the fact that most of these lines may be included in the category of commodities where personal examination in making selections is not essential (as would be the case of those commodities for personal consumption), and which consequently are non-resistant to the proposed changes.

A Measure of Performance

In tracing the economic benefits of this work of simplification, it is perhaps easier to visualize it through the use of percentages, the following percentages applying to varieties dropped from the several lines named:

	Per Cent
Bed springs	85
Fruit and vegetable baskets	86
Collars	83
Hammers, axes, etc	72
Lamp bases	96
Paper	85
Paving brick	98
Shotgun shells	85
Woven wire steel fence	85
Automobile tires	89

These are typical of a number of other lines in which the elimination percentages extend from 25 to over 90. Some of these records were made by entire lines, others by individual initiative.

It would be gratifying if it were possible to insert a table here which would indicate the monetary economies accomplished, the effect on lowered stocks of materials and completed products, as well as the savings made in warehouse rentals, taxes, insurance, handling charges and quickened turnover, but in most lines it is too early to do this adequately. The conditions under which simplification is carried out render it difficult, if not impossible, to trace such savings through an industry, and it is not always easy even in its application to individual cases, yet the study is well worth while and justifies the effort.

One of the greatest obstacles in getting such figures is the fact that all eliminations can not be made in a plant simultaneously, but must be done with due consideration to both the stocks of materials and finished goods on hand. Consequently, in making a reckoning of this kind, comparison will have to be made between the period before changes and the period when all simplification has been put into effect. During the interim, however, account may be taken from time to time as to quickened production schedules, prompter shipments, lower stocks carried both at factory and distributing points and of the improved conditions as to turnover by all three—factory, wholesaler and retailer.

Savings in Woven Wire Fence

This difficulty in measuring the extent of the benefits which accrue through the elimination of unnecessary varieties should not be attempted with the dollar yardstick alone—even though it may be necessary eventually to show results in that way for certain purposes—for such a picture will be far from satisfactory in showing the vast benefits and gains. Let us, however, take as a case in point one important line which has used simplification with most gratifying effect—the woven wire field fence used by every farmer, the railroads and other large consumers.

This industry confessed to 552 varieties, which were finally reduced to 69, with an expectation to reduce this number considerably more. This applied to the styles and kinds alone, but there also were other problems due to the bulky character of this commodity, including the fact that this fencing was put up in a little over 2000 kinds and sizes of packages. These were sweepingly reduced to 139. To measure the monetary value of this example of simplification would seem easy but, because of stocks being carried at many points for the convenience of the retailer and the farmer, it will be some time before the new is fully substituted for the old. Can there be any doubt, however, of the savings to be reaped by all classes involved?

Intra-Plant Progress

Recently another interesting phase of this work has developed in one of the large industries whereby a fine record of progress has been reported through intra-plant simplification and standardization. This report will be interesting and encouraging to many lines not represented by trade organizations, where difficulty has been experienced in the formation of cooperative groups. In such instances it is entirely possible, and in many most desirable, to proceed within the individual plant. If the concern undertaking intra-plant simplification includes several plants or subsidiaries, the opportunities are great for making splendid economies.

The plant above referred to makes farm tools in large variety, some of these variations being necessary, owing to soil conditions or other requirements. These had been multiplied through ambitious selling forces and in part because, in taking over certain plants, peculiar types and variations were inherited; yet in the comprehensive effort to simplify, an exceedingly large reduction of varieties has occurred. The success they are making is, no doubt, due to the interest of the management.

The elements of their problem included nomenclature, materials and selective use, design, practice, procedure and data, machine parts and fittings, machine units, machines complete, attachments and equipment, methods of test and research. From these fundamentals the study ramified into many details and touched every activity in the producing process. Within comparatively few years they have made most remarkable reductions in the number of types, sizes and kinds. These percentage eliminations range from 31 to 95 per cent, yet the consumer is being better served.

It is quite as necessary, in intra-plant and individual plant simplification, to make a survey as in operating through a trade association, and the results of such a survey should be dealt with from an economic rather than a competitive standpoint, for producers, like musicians, are not likely to be able to play "every instrument in the band." Here is where the greatest

test of broad vision occurs in the cooperative help given by sales and production heads to management in composing the elimination schedules.

Problem in Personal Wear

Again referring to the so-called style or personal wear lines, which have not yet been attacked in this waste campaign in an organized way, it is to be noted that much has been done in reducing the number of designs, colors, etc., selected to meet the seasonal use of such lines as clothing, shoes, hats and certain articles of women's wear. The demand for bridging the unemployment gap in a number of lines, as a matter of more economical production, has brought about studies for the purpose of establishing a greater number of staples in style and design.

A greater tendency is noted in the direction of relegating extreme or freak creations to the specialty or custom producer, where in our opinion they properly belong, instead of permitting them to clog factory production and increase the overhead on regular lines, for the doubtful satisfaction of giving a portion of the trade everything asked for. The successful efforts of individual producers of men's hats, clothing, shoes, women's wear, knit goods and other lines are paving the way for organized efforts in the not distant future, for there can be little breaking down of the high cost of articles of personal wear while unlimited and unnecessary varieties choke all attempts at volume production. There is nothing in this program which will destroy the privilege of individual selection, nor the right to have what we want when we want it, but rather a greater opportunity and at a less cost to the average consumer, who is the one most manufacturers seek to serve.

It is not too much, I believe, for us to claim that this economic awakening, which usually comes to the American people after a period of extravagance, is now not only well under way, but is better understood and is making a real step forward in our position as a leader among nations whose competition for the world's markets is likely to be more intense as war problems fade away and competitive fields everywhere are developed. Moreover, simplification and eventually reasonable standardization in its application to both production and quality of what we make are worthy of our greatest consideration in the protection of our home markets, as well as our trade developments abroad.

IRON IN KING "TUT'S" TIME

A Glimpse Into a World Without Iron—Then the Dawn of the "Iron Age"

We think of King Tut-Ankh-Amen and his civilization as existing in the dawn of history but, compared with the ages gone before his time, he was a modern, says "Pure Iron Era." According to the authorities such as Prof. Henry Fairfield Osborn, man began to make tools out of stone 123,000 years before the birth of Christ but, according to no less noted authorities, he did not fashion iron until more than 120,000 years later, about 2000 B. C., when the "Iron Age" began. But copper and bronze were known and used for tools and weapons 2000 years before iron was mined and smelted.

As was only natural, iron first came into use as a weapon of warfare. The rise and expansion of the Assyrian Empire came on the crest of the first wave to mark the beginning of the iron age. Through contact with the Hittites iron was introduced among the Assyrians, and the Assyrian forces were the first large armies to be equipped with weapons of ferrous metal. A single arsenal room of Sargon II's palace was found to contain 200 tons of iron implements.

The Egyptians might have maintained their empire, or at least sustained it for a longer period, had they imported quantities of iron from Hittite mines along the Black Sea. That the Egyptians did secure some ferrous metal from this source is recorded on a clay tablet written about 1250 B. C. by one of the Hittite kings, who mentions that he was about to send a shipment of "pure iron" to Rameses II, who had asked for it, and that in the meantime an iron sword was being sent to the Egyptian king as a gift. This was in the thirteenth century B. C., or approximately 700 years after the recognized beginning of the iron age. While the Hittite civilzation was lower than that of Egypt and Babylonia, it might be said that this nation made up for its lack of culture by serving as the world's ironmonger.

Forced-Draft Smelting Furnace

It is also recorded that the Egyptians developed a forced-draft furnace—consisting of a pit for ore, connected with bellows operated by the feet of slaves, as early as 1500 B. C.

About the time Rameses II received a shipment of "pure iron," ferrous metal was introduced among the Greeks. But it must have been a long time before iron came into common use in this nation, as the poet Aeschylus 500 years later called it the "stranger from across the sea." By King Tut-Ankh-Amen's time, however, iron was common in Greece, and had virtually replaced bronze as a metal in war and industry. The age of iron, in fact, marked the beginning of real civilization in Greece.

The question has often been asked—what part did iron play in the marvelously rapid progress and control of mechanical power in Egypt during the thirtieth century B. C.? According to Prof. James H. Breasted, no other period of the world's history until the nineteenth century witnessed any such development. Would it be possible today, even with unlimited labor and time, to erect a solid mass of masonry containing 2,300,000 blocks of limestone, each weighing on an average 2½ tons, without the aid of metal machinery? The workmen, estimated to number 100,000, the largest group of laborers ever assembled in the world's history for a single task, were engaged for 20 years in building the great Pyramid. And this took place almost 1500 years before King "Tut" came to the throne, and 1000 years before the beginning of the iron age.

Almost Pure Iron Produced

It is a tribute to the labor and skill of the early iron workers that there remain today a few samples of prehistoric ferrous weapons and tools. Because of the slow methods of manufacture—the repeated heating and working of the metal—the impurities were removed and an almost pure iron was produced, to resist the corrosive influences of the ages.

What is thought to be the oldest piece of wrought iron in existence is a sickle blade found under the base of a sphinx near Karnak, Thebes, Egypt. Perhaps may be added a blade, probably 5000 years old, found in one of the pyramids. From this, one might conclude that iron was in general use in Egypt prior to the thirteenth century B. C., and that the metal which might prove the theory today had rusted away, were it not for the fact that Egyptologists find no iron nor iron rust in any of the tombs of the nineteenth dynasty.

W. M. Flinders Petri, who has made wide and intensive investigations in Egypt, states that there is no clearly dated example of the existence of iron in Egypt before 700 B. C., so it may be that Rameses II may not actually have received this shipment of "pure iron" from his Hittite neighbors, or that King Tut-Ankh-Amen may not have seen ferrous metal in use in his empire.

But whether or not iron was used in Egypt, or to what extent it was employed by the other nations of the world 3000 years ago, we are impressed by the great ages through which man lived without iron; surprised that a civilization such as flourished in Egypt 3000 years ago could have been built up without large quantities of ferrous metal; and perhaps shocked in coming to realize how pitifully small have been our contributions to the science of ferrous metallurgy up to the present time.

TREATING HIGH-SPEED TOOLS

New Furnace with Special Equipment for High Temperatures

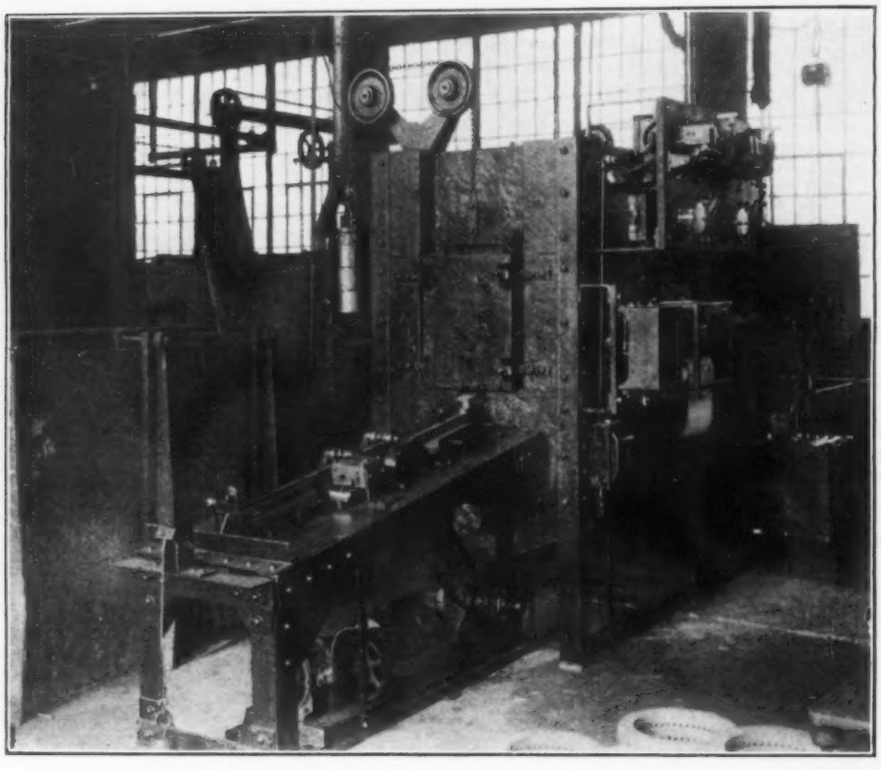
A little over a year ago the Gleason Works at Rochester, N. Y., were confronted with the problem of heat treatment of high-speed tools for automatic gear cutting machines, the chief product of this company. In the finishing heat treatment operation these tools required a temperature approximating 2350 deg. Fahr. before quenching. The heat treatment at that time done was in an oil furnace but the results secured were not entirely satisfactory because of the non-uniform heating conditions resulting in non-uniformity in the finished product, especially as it pertained to hardness.

Toward the solution of the problem the Gleason Works have placed in operation an electric furnace unit designed and manufactured by F. J. Ryan & Co., Philadelphia. The obtaining of resistors capable of withstanding temperatures higher than 2000 deg. Fahr. has been a hindrance in solving the problem. During the war the German chemists developed a type of quartz carbon resistors for which working temperatures up to 2400 deg. were claimed. With the hope that these might solve the temperature problem, a few were imported by the Ryan company. They were found, however, too fragile for general commercial usages at the temperature desired. The Ryan company then commenced experimenting on the use of solid graphite resistors. In its early tests the electrode oxidized very quickly, and burned out before the desired temperature had been reached.

In the first experiment with solid graphite resistors power in the amount of 27 kw. was applied but, as stated, this did not secure the results. Working on the theory that some method would have to be devised to counteract the effect of oxidation on the heated electrode, that is, a method whereby the heat of the electrodes could be increased instantaneously to a great many degrees higher than the possible saturation affinity of the air, the Ryan company designed a special low voltage transformer which was built by the Wagner Electric Mfg. Co., St. Louis. The results were satisfactory for commercial usages. Temperatures up to the working conditions of the furnace were reached easily and it was found that, after this temperature was reached, the power input of this transformer could be reduced to the original calculation of necessary input. Therefore the high power input is used only for bringing up the temperature and to overcome oxidizing conditions. After operation of the furnace for some period it is found that tools of exceptional quality are being secured.

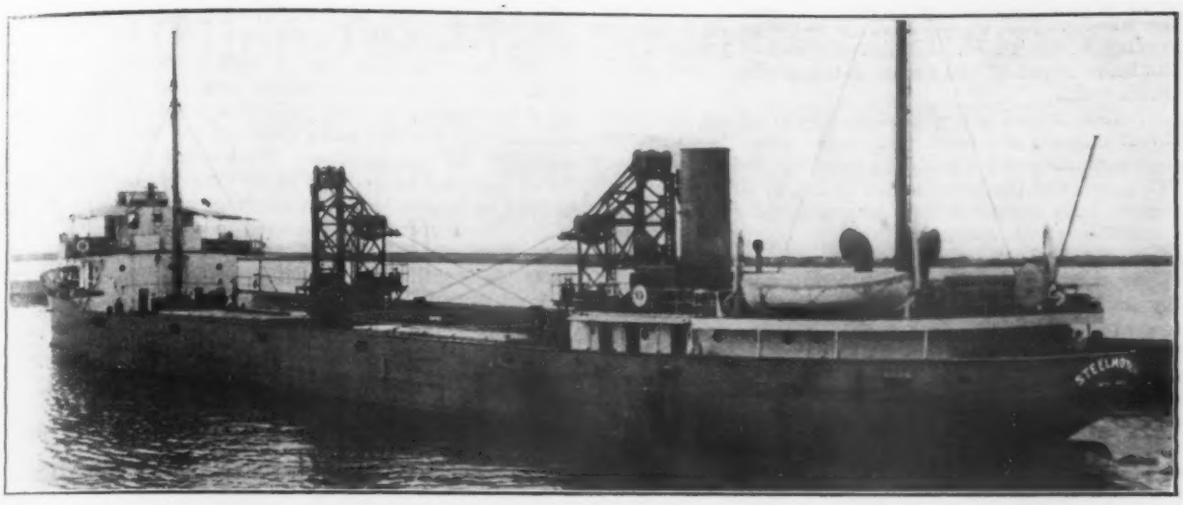
One of the distinct advantages covered by this furnace design is the fact that the tools are conveyed automatically through the furnace and are then extruded directly into the quenching bath. The heat of the tools entering the quenching bath causes fumes to be given off which prove a direct benefit both to the electrode and to the tools. Toward the extension of the life of these graphite resistors, further experiments were carried out and it was found, by the injection of a small amount of gas into the high heating chamber, that from 30 to 40 hr. of continuous service can be obtained. Experiments are now being carried out toward the coating of the electrodes with the viewpoint of extending even this present life.

The furnace is briefly a unit made up of two chambers, one the main heating chamber in which metallic resistors are used and the final heating chamber in which the graphite resistor is used. The two chambers are separated by a wall. Both chambers are automatically controlled with Leeds & Northrup temperature control devices with power input and switches designed by the Ryan company.



A Two-Chamber Electric Heat-Treating Furnace for High-Speed Steel Tools, Using Specially Constructed Equipment to Secure Temperatures Higher Than 2000 Deg. Fahr.

The idea of obtaining steam power from the heated center of the earth is not practicable at the present time, according to Dr. Thomas T. Read, of the Department of the Interior, who, with F. C. Houghten, of the research laboratory of the American Society of Heating and Ventilating Engineers, has prepared for the Bureau of Mines a report on the cooling of mine air. The amount of heat that can be derived from hot rock is not proportional to its temperature, but is limited by the conductivity of the rock. It can only be usefully employed on the surface and how to get it there without losing most of it on the way is the problem.



Steel Corporation's New Freight Service

Boats Operate on Lakes in Summer and in Southern Waters During Winter—Method Watched with Interest— Cargo Handling Equipment a Feature

THE placing in operation by the United States Steel Corporation of two freight boats on the Great Lakes last summer for handling shipments of its own mill products from Lake Erie and Lake Michigan ports to Montreal for the Canadian trade is a step forward in transportation methods in the steel industry. At the same time it has opened up a promising field for the use of heavy handling equipment of a modern type on boats for loading and unloading cargoes.

These boats were placed in commission in July, taking cargoes from Chicago, Lorain and Conneaut, and it is stated that their operation has proved entirely successful. Late in the year they were sent to the Atlantic Coast and down to the Gulf of Mexico. During winters they will operate in Southern waters carrying products of Steel Corporation mills from Mobile and New Orleans to various Gulf ports, thus being kept in operation the entire year. It is stated that this new transportation project of the Steel Corporation is being watched with considerable interest by at least one other large steel producer which may adopt the same plan for handling steel products by water.

From the cargo handling equipment standpoint the outstanding feature of the two boats is the use on each of two specially designed 5-ton electrically operated cranes, in a general way resembling locomotive cranes, that are mounted on the decks for handling the cargoes. With this crane equipment it is not necessary for boats to load or unload where there are mechanical dock handling facilities as they can take on their cargoes at any convenient dock.

The two boats named the "Steelmotor," shown in the accompanying illustration, and "Steelvender" were built by the Steel Corporation at its Federal Shipbuilding Co. plant and are operated by the Isthmian Steamship Line, which is the operating company for the United States Steel Products Co., another Steel Corporation subsidiary. The vessels are 258 ft. long, or of the Welland Canal size, and have a net capacity of 2100 net tons. They are of the Isherwood type and represent a departure from the large steam driven lake freighters in that they are electrically propelled and otherwise electrically operated. The boats have the direct Diesel drive, power being supplied by a 750 hp. MacIntosh and Seymour Diesel engine connected to a Worthington Diesel generator. The cranes, dock machinery, steering engine, winches and other deck machinery, as well as the engine room auxiliaries, are electrically driven and one of the boats has an electrically-operated steering gear. Power for the auxiliary equipment is furnished by two 90 hp. Diesel engines connected to two 60 kw. generators. Each of the cargo holds has an unusually large hatch, 20 x 40 ft., to permit material in long sections to be lowered into the hold.

The cranes are of the level luffing type and each has three motors, one for hoisting, one for rotating and a third for booming. The length of the boom is 50 ft. and the maximum load on the hook is 10,000 lb. at any radius of from 21 to 50 ft. The crane has a hoisting speed of 130 ft. per min., a rotating speed of 3 r.p.m. and a booming speed of 300 ft. per min. The dead weight of the boom is balanced by a counterweight and

Two 5-Ton Electrically Operated Cranes, Mounted On Deck, Permit Handling Cargo at Any Convenient Dock

the live-load pull on the boom is balanced by a special reeving of the ropes. Limit switches are provided for the boom to cut off the power at the minimum and maximum radii.

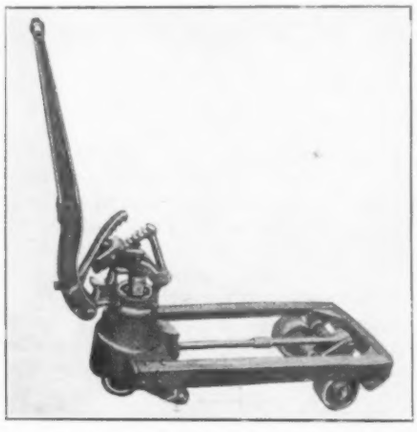
Series wound crane motors operating on 220 volt direct current are used. The hoist motor is 65 hp. at approximately 600 r.p.m., the rotating motor 25 hp. at 725 r.p.m. and the boom motor 15 hp. at 600 r.p.m. The motors have contactor type magnetic control. The hoist controller gives dynamic braking connections when lowering. All control equipment is totally inclosed in water tight cases. The cranes were designed and built by the Brown Hoisting Machinery Co., the motors furnished by the Diehl Mfg. Co. and the control equipment by the Cutler-Hammer Co.

The boats' cargoes will be made up largely of structural steel rails, billets, plates and tin plate. Structural sections up to 65 ft. in length can be placed in the hold, longer sections being piled on the deck which has room for 500 tons of cargo. Each crane has the capacity of handling an average of 50 tons an hour, although 75 tons have been loaded in one hour with the use of one crane. Both cranes can be used in conjunction in handling long plates but one has handled material up to 65 ft. in length. The boom is of sufficient length to pick up a cargo 25 ft. from the vessel's side.

Lift Truck with Single Frame Feature

The lift truck illustrated, notable for its small number of parts and having the lifting and release mechanism concentrated in the head, is being marketed by the Sturdi-Truck Mfg. Co., Wilmington, Del. Single-frame construction, one frame on which the load is both elevated and carried, is also a feature of this equipment.

The truck elevates step-by-step in a manner similar to the ordinary automobile jack. It may be elevated or released with the handle held at any angle to the load, which is a convenience when employed in crowded



Single Frame Construction Is a Feature. The load may be elevated with handle held at any angle or position

aisles and narrow corners. All parts are of steel and working parts are case hardened to provide maximum wear. Hot riveted channel or angle steel side bars are employed. The trucks are available in capacities ranging from 2000 to 5000 lb. The effective arrangement of levers in this design is said to eliminate the non-elevating chassis, usually employed on lift trucks. The frame is carried by a fork at the forward end and supported by a swinging lever at the rear, to which are attached two wheels equipped with Hyatt roller bearings. An elevating lever attached to a yoke operates upon the fork as fulcrum. To the front of the yoke is attached the handle with toothed claw as shown, which engages the free end of the elevating lever. A reach rod connects the rear lever with the front lever which presses up against a special ball bearing on the shoulder of the fork.

When the handle is depressed the elevating pawl is engaged in the elevating lever and the latter comes into action using the fork as a fulcrum. The fork with the front wheel remains stationary, the frame rising evenly front and rear because of the action of the front and rear levels. As the frame rises the forward end of the front lever, bearing against the ball bearings in the fork, remains stationary. The rear end, to which is attached the reach rod, rotates around the front lever pin as an axis and transmits a forward movement to the reach rod. This rear lever is also attached to the frame by a shaft which acts as an axis. As the top part of the rear lever is pulled forward the bottom part, to which is attached the wheels, moves backward. This lengthening of the wheel base is said to cause the rear end of the truck to rise evenly with the front end.

A holding pawl automatically falls into notches on the rack of the yoke, and any part of the 3-in. lift available may be used. Descent of the load is controlled by a piston attached to the yoke, working in oil in a closed dash pot.

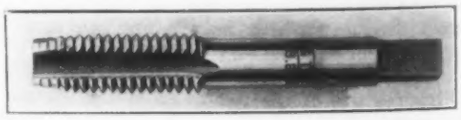
Ground Taps of High-Speed Steel

Ground taps of high-speed steel, in coarse and fine thread series and in ten stock sizes from ¼ in. to 1 in., have been placed on the market by the Jones & Lamson Machine Co., Springfield, Vt.

The shanks and thread form of these taps are ground to accurate shape and dimensions after the tap has been hardened. Distorting effects, such as warped teeth and bent taps, produced by the hardening heat, are corrected. Ground taps run true in a true holder, cut true and to accurate size and lead, which is emphasized by the makers as making the fitting of properly made screws unnecessary in assembly, even under the conditions of wrench-tight stud fits. The ground high-speed steel taps give better results than unground taps of the same material, and are said to have made record in number of holes per tap and in number of holes tapped in an hour.

Pitch diameter tolerances of 0.0005 in. or even less are claimed to be readily maintained by the grinding process employed. Tolerances smaller than 0.0008 in. are stated to be impracticable, however, because of the difficulty between the manufacturer and the user in agreeing on the measurements. Lead error is said to be held within plus or minus 0.0005 in.

These limits are based on the close fit of the National Screw Thread Commission. With proper lubrication, alinement and cutting pressure, and in ordinary



Shanks and Thread Form Are Ground After Hardening

materials, it is stated that holes within the limits of that fit should be produced, but because of variations in the foregoing factors, the taps cannot be guaranteed to do so.

Taps varying from standard stock dimensions and special taps are also available.

Streets of three levels were advocated for New York before the American Society of Civil Engineers last week, the upper level being for pedestrians, the middle for automobiles and the lower for rapid transit lines.

"The Effect of Silica in Iron Ore in the Cost of Pig Iron Production" is the title of a publication of the Bureau of Mines, designated as Serial No. 2560. The authors are T. T. Read, T. L. Joseph and P. H. Royster.

Mellon Tax Plan Strongly Supported

Opposition Also Is Vigorous—Bonus Less Popular—James A. Emery Appears Before House Committee on Ways and Means

BY L. W. MOFFETT

WASHINGTON, Jan. 22.—Speaking for the National Association of Manufacturers, the National Founders' Association and the State Manufacturers' Association of 33 States, strong indorsement of the Mellon tax program was given by James A. Emery, counsel of the first named organization, and Robert Sinclair of Mudge & Co., Chicago, chairman of the taxation committee of the National Association of Manufacturers, when they appeared before the House Committee on Ways and Means on Tuesday of last week.

Among the points emphasized by Mr. Emery was that surtax reductions ought to be considered, not merely from the viewpoint of their direct effect upon the individual taxpayer but their economic and social effect upon the life of the country.

"It will be of little advantage to the individual to receive a personal reduction in his own tax if he is not relieved of the indirect taxation to the amount of which the economic effect of tax-exempt securities so largely contributes," said Mr. Emery.

"Investment cannot be compelled—it must be tempted. The experience of the past two years suggests that we have had substantially a continuing deficit in the amount of free capital annually required for replacements, experiment and the natural expansion of industry, commerce and transportation in response to the normally increasing demands of the people of the United States for commodities and services.

Compared with Garner Plan

The superiority of the Mellon plan over that proposed by Democrats of the Ways and Means Committee, known as the Garner program, was held by Mr. Emery to be clear.

"In comparison with the Garner plan," said Mr. Emery, "the proposal of the Secretary of the Treasury is predicated upon the experience of the Government in the effect of high surtaxes upon the flow of public revenue, and the judgment of the Secretary of the Treasury upon the effect of his proposal is predicated upon a lifelong experience as a financier. With all due respect to the opinion of less experienced individuals, we prefer to follow the judgment of the ablest Secretary of the Treasury since the days of Hamilton, supported by private and public experience."

Quick action on a tax reduction program was urged by Mr. Emery, who declared that there is a psychology of expectation attached to the subject. The whole country, he pointed out, is aroused to expect tax relief. If it is to be denied, unduly delayed or diminished, he said, there is likely to be a very human reaction expressing itself in anxiety. Treating the question from its broadest point, Mr. Emery declared that all pay taxes, and not merely those upon whom they primarily fall.

"The sound policy of tax reduction ought, therefore, to be in terms which bring its benefits to all indirect as well as direct payers of taxes," he said.

Approval also was given by Mr. Emery to the proposed tax board of appeals in the Mellon program. This is a proposed administrative reform that has received comparatively little attention when compared with the vast discussion that has been given to the question of a cut in actual rates of taxes.

Would Facilitate Adjustments

"Administration is 90 per cent of a good tax law," Mr. Emery declared. "The pending proposal promises not only a decided improvement in clarifying ambiguous sections of the present law which have been a source of anxiety and dispute, but provides for the first time an independent, impartial and mobile board of appeals which not only brings the tax law to the taxpayer so that adjustments may be made within reasonable distance of his residence or place of business, but establishes a board which stands between the taxpayer and tax collector and performs a judicial function similar to the boards of assessment with which we are still familiar in the taxation of real property."

Addition to the Mellon measure of a provision exempting Americans, engaged in business abroad and residing there, from income taxation on that portion of their income derived from a foreign country, also was urged by Mr. Emery.

"The United States has never had an equal opportunity for engaging in foreign trade because of handicaps which Americans are under," said Mr. Emery. "American manufacturers can carry on foreign trade only by having representatives in foreign countries. Great Britain gives its citizens engaged in business in other countries tax exemption at home and in consequence Americans are handicapped because they must pay taxes both to the country from which they derive the income and also to their home Government."

Members of the committee themselves appeared to be impressed favorably with this proposal, but doubt was expressed whether Congress would accept it inasmuch as in the past it has been attacked in Congress and the present character of Congress makes the outlook for adoption of the amendment discouraging.

Mr. Sinclair expressed sentiments similar to those of Mr. Emery.

Politics and Personalities

The entire tax program, as had been anticipated, has become a tangle of all sorts of proposals, of partisan attacks and counter-attacks, and even of personalities, and a forecast as to what this Congress may do with taxation would be a futile thing. There are many favorable to the Mellon program who concede that the many subtle appeals and proposals that have been made may endanger its passage. The Garner proposal, while promising sweeping reduction in normal taxes, apparently has struck a popular chord with those who have not given the subject deep thought. Its effect on industry and commerce, however, it is declared by some students, would be extremely serious because of the high surtaxes that would remain, tending toward discouraging industry and therefore creating unemployment. By some it is actually thought the Garner plan would create a Treasury deficit not alone by relieving a great many present taxpayers from paying direct taxes, but by drying up liquid investments for industrial enterprise and by diverting increased sums to investment in tax-exempt paper.

Attempts to destroy the Mellon program also are being made by the appeal that business interests of the country, railroad companies, and other enterprises have organized a tremendous propaganda for the plan and are attempting to coerce employees to write to Congress in favor of it. But those opposing the Mellon program apparently see no propaganda in their efforts to further their plans. In any event, the contention is made that both sides have a perfect right to organize for a given plan, no matter what term may be applied to their efforts. To say that coercion is being attempted in furtherance of the Mellon plan, it is held, is entirely another thing.

The means being employed to defeat the Mellon

program, including the action taken in the Senate to make wholesale investigations of every movement under way in the country are interpreted as an admission that the Mellon plan has appealed to the country so widely that its opponents have been afraid that it would succeed. The general belief seems to be that while part of the program will not be adopted, a portion of it will be, if there is any tax program at all at this session of Congress and both the Democratic and Republican parties realize that no reduction in taxes will place them in a bad light at this particular time in view of the presidential campaign.

Unfortunately, it seems that the part of the Mellon program which now seems most susceptible to defeat is that proposing reduction in surtaxes, which the Secretary of Treasury has strongly urged, along with vigorous argument for cutting normal taxes, as a means of expanding industry and commerce and increasing the wealth and employment of the country. The appeal, even though it does not bear any scrutiny, that the Mellon measure is a rich man's bill, has had the effect of creating much opposition to sharp cuts in surtaxes.

Mr. Winston's Argument

An extremely good answer to this appeal has been made by Under Secretary of the Treasury Garrard B. Winston, who has urged that the subject of taxation should be approached from a purely non-partisan viewpoint, and has stated that the Treasury stands in the open and submits its case in every particular to the public. Briefly, he explained, the Mellon bill gives a credit of 25 per cent for earned income, reduces the normal and surtax rates, makes changes in the interest of simplicity and clarity, eliminates methods of tax avoidance, and provides a more satisfactory method of determining tax liability.

"These recommendations were not drawn with the idea of favoring one class against another, but every payer of a personal income tax is benefited," said Mr. Winston. "About 70 per cent of the loss of revenue to the Government from the recommendations comes in the brackets of income under $10,000 a year, and only 2½ per cent of the loss of revenue from income in excess of $100,000 a year, and it is estimated that even this 2½ per cent will be more than made up in the second year of the operation of the law. It is not a rich man's bill; it is not a poor man's bill; it is fair to all."

Reduction of taxes of the small taxpayer only, Mr. Winston said, ignores completely the higher taxes paid indirectly by those same persons through the economically unsound basis of taxation which Secretary Mellon seeks to correct. The Garner plan to grant complete exemption of the largest number of taxpayers also was said to utterly ignore the economic features of taxation. Representative Frear of Wisconsin, Mr. Winston declared, proposes to restore all high war taxation and to put on the books taxes which would be ineffective to produce revenue.

Attitude of Bonus Advocates

The popular demand for tax reduction has become so insistent that even the bonus advocates cannot ignore it, Mr. Winston pointed out. His statement is thoroughly justified. Even some of the strongest original advocates of the bonus have been forced to abandon their political notions on this subject and to turn on the proposition. The country, it is apparent, finally has realized the false logic of those who are urging that it is possible to both reduce taxes and enact bonus legislation. This turn has caused alarm in the ranks of steadfast advocates of the bonus and efforts are being made to stem the tide, but they seem hopeless. The bonus now seems to be improbable of passage as contrasted with the good chance it seemed to have when this Congress convened. This at least is held to have been one good result from tax reduction agitation, whatever may be done as to actual tax cuts. Preference given to tax legislation in the House over bonus legislation is another indication of the power lost by bonus advocates who had sought to give bonus legislation preference. Another interesting development which has been given little attention is the fact that the Senate has created a subcommittee of the Committee on Finance to pass on all bills for soldiers' bonuses, hospitalization, etc. This committee is made up of three Republicans, Senator Smoot of Utah; Senator Reed of Pennsylvania, and Senator Ernst of Kentucky, and two Democrats, Senator Simmons of North Carolina and Senator Walsh of Montana. All three Republicans are represented as being opposed to a bonus.

Influence of the Blocs

The blocs, however, might force the issue on the floors of Congress because their power as small minorities coalescing with each other and with disgruntled groups of Democrats and Republicans who ordinarily are classed as "regular." This would create sharp contests, but defeat of the bonus seems assured nevertheless because of the number originally for it who have turned against it, and with this development it is maintained the bonus could be defeated even if legislation for it passed Congress because there would not remain a two-third majority to support bonus legislation on a veto from the President which is taken as a matter of course in view of his message to Congress.

The "blocs" have a real power, though, that is not to be ignored when it is used to obstruct rather than to enact legislation. This was manifested by the revolutionary changes forced in House rules which now permit amendments to the tax bill or other measures that are not germane to the legislation under discussion. This amendment was urged by the Democrats, who themselves were responsible for the so-called gag rule preventing such amendments. They with the "bloc" put through a repeal of the rule, which regular Republicans say Democrats will again seek to have invoked if they come into power.

White House Support

The efforts, however, of the blocs and others who are trying to defeat the Mellon program are not being permitted to go unresisted. On the contrary they have heightened support of the Mellon program from the White House, from Congress itself, and from the business world. The steps taken in the Senate to investigate so-called propaganda in the Mellon program actually have been answered by an intensified drive in favor of the program. Clearly, the business interests of the country appreciate their rights under the Constitution and are not going to permit Congress to intimidate them by mere inquiry into so-called propaganda for the Mellon program.

That the attacks on the Mellon program have had the effect of stimulating further support of the White House was indicated last Friday when it was announced that President Coolidge stands firm in support of the program without material modifications. President Coolidge is known to share fully the conviction of Secretary Mellon that surtaxes should be cut to the point urged by the Secretary and he will seek support of this view by members of Congress. The President is understood to realize that a number of amendments undoubtedly will be made to the Mellon bill but this will not deter him from advocating the passage of the measure in its original form. At the same time, it is confidently believed that the President would not veto the bill should it be passed by Congress without providing as great reductions as are urged by Secretary Mellon.

Attitude of Various Organizations

The bill was strongly supported by Under Secretary Winston, and representatives of various business associations when they appeared before the Ways and Means Committee last Friday. Opposition of the measure was expressed by representatives of farm organizations. Among those appearing before the committee in support of the Mellon program were representatives of the American Mining Congress, the American Bankers' League, the Colorado Bankers' Association and the National Cigar Leaf Tobacco Association. Representatives of the American Farm Bureau Federation and the National Grange opposed the bill.

The Chamber of Commerce of the United States, while approving the Mellon bill in the main, has pre-

pared a list of recommendations for amendment of the revenue act which will be submitted to a referendum. The recommendations cover administrative as well as rate provisions and among other things include "revision of the normal and surtax rates on individual incomes to an extent equal in its results on revenue, and a large part of the surtaxes anticipated at the end of the fiscal year," a "reasonable differential between earned income and other income, and repeal of war excise taxes confined to particular businesses."

House hearings on the bill came to a conclusion last Saturday. Chairman Green of the committee, during the course of the testimony of Mr. Winston, questioned the accuracy of the Treasury estimate that the reduction in surtax rates to the minimum of 25 per cent would mean a loss in revenue of only $100,000,000. Mr. Green expressed the opinion that on the basis of current receipts, the loss would be closer to $200,000,000. Under Secretary Winston, however, defended the estimate on the ground that an allowance had been made for greatly increased revenues by reason of a prospective diversion of funds now invested in tax-exempt paper.

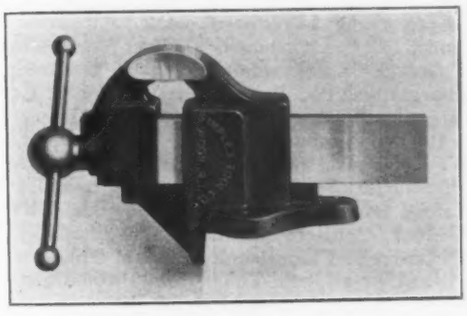
Mr. Winston contended that if the tax bill is passed at a fairly early date the effect of a marked reduction in surtaxes will be so favorable upon business activity as to increase greatly the amount of taxable income for the present year. Mr. Green was not convinced by the argument of Mr. Winston and implied by his questions that he disagreed with the view of the Treasury Department that high surtax rates have been a material factor in hampering business, particularly construction work. The attitude of Mr. Green was taken to indicate that the committee is altogether likely to recommend changes upward in the Mellon surtax rates. The bill is to be reported out by the committee by Feb. 11.

"In my experience as a lawyer I have found that whenever a new business proposition comes up, the tax question always was considered first," said Mr. Winston. "Building construction has been hampered."

Bench Vise with All-Steel Slide

The new parallel bench vise illustrated, called the Simplex Gray, has been placed on the market by the Simplex Tool Co., Woonsocket, R. I. It is claimed to be the only vise having an all-steel slide.

The body of vise is cast of a special grade of crucible iron, and the jaws are of steel, hardened and



An All-Steel Slide Is a Feature

ground. The square thread screw is of steel, machine cut, and is retained in place by a cap in front of the sliding jaw, an arrangement intended to eliminate the necessity of coring the inside of the vise for a collar. The nut is of ample length and may be replaced conveniently. The vise is available in sizes from 3 to 7 in.

Electrical Conductivity of Refractories

In the general study of the electrical conductivity of refractories, being conducted at the Columbus, Ohio, experiment station of the Bureau of Mines, tests have been completed on Maryland, Indian and Italian talcs from 500 deg. C. to and including 1000 deg. C. These talcs at the present time are being used for the manufacture of electrical insulators and cores for electrical heating appliances. Since 1000 deg. C. represents the maximum temperature at which these talcs are burned and used, tests were not carried to a higher temperature. Preliminary tests have been made on diaspore and magnesite.

Heavier Boilers for Higher Pressures

The tendency of central power stations to use steam boilers of higher pressure in order to secure higher turbine efficiency is further emphasized by the four 1530-hp. boilers to be operated at 400-lb. steam pressure recently ordered by the Southern California Edison Co. from the D. Connelly Boiler Co., Cleveland. Boilers for operation at the same pressure are now being built for the Detroit Edison Co. and for the Public Service Co. of Northern Illinois at Waukegan, Ill. The higher pressures are being provided to obtain steam at higher temperature, which with the use of super-heaters reaches the turbines at 700 deg. Fahr.

It is stated that in 1914 the maximum pressure for steam boilers for central power stations was 275 lb. There has been a steady increase since that time, necessitating boilers of much heavier construction. The boilers to be built by the Connelly company will be furnished with super-heaters and economizers and the furnaces are arranged for a combination of oil and gas firing. The large drums will be made of plates 1¾ in. thick. The boilers will be installed at Long Beach, Cal.

Wholesale Prices in December

Except for the figure in August, the wholesale prices of commodities as reported by the Bureau of Labor Statistics touched the lowest level of the year in December, at 151. With the same exception, August being 150, this was the lowest figure for 18 months. Compared with a year ago, 3 of the 9 individual groups of commodities have shown decreases, 4 have shown increases, and 2 have not changed. The general level has dropped 3.2 per cent, due in large measure to a drop of 25 per cent in the fuel and lighting item.

Metals and metal products, which now stand at 142, compared with 131 a year ago, have been consistently below the general average since December, 1917. They did not reach the high peak in 1920 which was reached by most other commodities, and now show 18 per cent less advance over the pre-war figure than is the case with commodities in general.

Details in the table show the 9 groups and the summary, indicating the relative prices that the peak reached in 1920, the prices one year ago, one month ago, and up-to-date, as well as the percentage reduction of the past year.

(1913 Average Is 100)	Peak of 1920	Dec., 1922	Nov., 1923	Dec., 1923	Reduction in One Year, Per Cent
Farm products.....	247	145	146	145	0.0
Foods	248	144	148	147	*2.1
Cloths and clothing..	346	194	201	203	*4.6
Fuel and lighting...	281	216	167	162	25.0
Metals and metal products	203	131	141	142	*8.3
Building materials..	300	185	181	178	3.8
Chemicals and drugs	213	130	130	130	0.0
House furnishings...	275	182	176	176	3.3
Miscellaneous	208	122	118	116	4.9
All commodities.....	247	156	152	151	3.2

*Advance.

Cost of living in the United States in December was slightly below the November level, according to the National Industrial Conference Board figures obtained from the wage earners' budget. It stood at 65 per cent above the July, 1914, level, compared with 65.3 per cent in November. The change was made by a small decrease in the cost of food, partially offset by an increase in the cost of clothing.

Ambrose Swasey Awarded Fritz Medal

The John Fritz gold medal has been awarded for 1924 to Ambrose Swasey, vice-chairman board of directors and one of the founders of the Warner & Swasey Co., Cleveland. The award was made for the building of great telescopes, founding of the Engineering Foundation, and the invention and manufacture of machine tools, precision instruments and military and naval range finders.

AMBROSE SWASEY

Mr. Swasey was born in Exeter, N. H., 1846, of New England lineage He learned the machinist's trade in Hartford, afterward removing to Chicago. Since the early eighties he has resided in Cleveland, where with Worcester R. Warner he established the Warner & Swasey Co. Mr. Swasey is a past president and honorary member of the American Society of Mechanical Engineers, having been one of its organizing members. He is an honorary member of the American Society of Civil Engineers and of several other engineering societies of America and Europe. He is an officer of the Legion of Honor of France and has received other honors at home and abroad.

Among the famous telescopes built under the direction of Mr. Swasey are the 36-in. Lick refractor at Mount Hamilton, Cal., the 26-in. telescope of the Naval Observatory at Washington, the 40-in. telescope of the Yerkes Observatory at Williams Bay, Wis., and the 72-in. reflecting telescope of the Dominion Astronomical Observatory at Victoria, B. C.

Recently Graduated Italian Engineers to Work in American Plants

The American Engineering Council plans to aid the Italian Ambassador, Prince Gelasio Caetani, in furthering "intellectual immigration" from Italy, a movement initiated by the ambassador. Fifty young Italian engineers, recent graduates of technical schools, will be sent shortly to industrial centers to become laborers in large manufacturing plants. The vanguard of fifty will be followed this year by at least a hundred more, annual migrations being planned.

Twenty-five of the Italian engineers will be put to work in the Ford plant, seven will go to the Westinghouse Electric & Mfg. Co., and three to the General Electric Co. The others will be distributed in large plants in the East and Middle West. They are to begin work as simple laborers, at ordinary workmen's pay, with the understanding, however, that they will be given a chance to shift gradually from one department to the other so as to obtain a broad knowledge of the entire industrial process.

COMING MEETINGS

January

Society of Automotive Engineers. Jan. 22 to 25. Annual meeting, General Motors Building, Detroit. Coker F. Clarkson, 29 West Thirty-ninth Street, New York, general manager.

National Safety Council and American Society of Safety Engineers. Jan. 22. Joint meeting of the engineering section at the Engineering Society Building, 29 West Thirty-ninth Street, New York.

American Institute of Steel Construction. Jan. 23 and 24. Annual meeting, William Penn Hotel, Pittsburgh. Charles F. Abbott, 350 Madison Avenue, New York, executive director.

American Society for Steel Treating. Jan. 31 to Feb. 1. Winter sectional meeting, Rochester, N. Y. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, secretary.

Chicago Foundrymen's Club Elects Officers

The Chicago Foundrymen's Club, at its monthly meeting at Chicago, Jan. 19, elected officers for the coming year as follows: President, Eugene W. Smith, Crane Co., Chicago; vice-president, G. P. Fisher, foundry superintendent, the Whiting Corporation, Harvey, Ill.; secretary-treasurer, G. L. Lacher, Western editor THE IRON AGE, Chicago; directors, James Murphy; Charles L. Larson, Armour Institute, Chicago; Carl M. Pearson, Pickands, Brown & Co., Chicago, and J. H. Hopp, Charles C. Kawin Co., Chicago; chairman program committee, Edwin C. Boehringer, Penton Publishing Co., Chicago.

The club also elected J. H. Hopp as its representative on the Joint Committee on Molding Sand Research sponsored by the American Foundrymen's Association and the National Research Council. At the invitation of the committee, representatives are being named by all district and local foundrymen's associations in the country.

Industrial Cost Association Directors

The following have been elected directors of the Pittsburgh Chapter, Industrial Cost Association, for 1924: George W. Sheridan, assistant treasurer West Leechburg Steel Co., Pittsburgh; Charles S. Garrison, treasurer The Sutton Press, Pittsburgh; James P. McLean, auditor Pittsburgh Forge & Iron Co., Pittsburgh; W. W. Holsinger, auditor Lewis Foundry & Machine Co., Pittsburgh; James E. Smith, chief, manufacturing accounting department, National Tube Co., Pittsburgh; W. F. Menk, cost accountant, Pittsburgh Water Heater Co., Pittsburgh; Frederick E. Harlan, chief, statistical department, National Tube Co., Pittsburgh; J. F. Johnston, auditor Oliver Iron & Steel Corporation, Pittsburgh; A. D. Lowdermilk, auditor Standard Seamless Tube Co., Pittsburgh; H. J. White, secretary H. I. Dixon Co., Pittsburgh; R. S. Porter, manager of production the McConway & Torley Co., Pittsburgh, and C. Leslie Phebus, accountant S. Strunz & Son, Pittsburgh.

Bethlehem Merger Hearing in New York

The Federal Trade Commission, which has held hearings in various cities in the Bethlehem Steel Co. case, involving the purchase of the Lackawanna and Midvale steel plants, moved its activities to New York this week. The New York hearings, which may last a month or two, were opened Monday morning, Jan. 21, in room 411, Federal Building, Broadway and Park Place, with R. C. Miller, purchasing agent of the Staten Island Shipbuilding Co., Staten Island, N. Y., as the first witness.

B. B. Bane represented the Federal Trade Commission as counsel and the Bethlehem Steel Co. was represented by H. A. Moore and W. W. Robison of the law firm of Cravath, Henderson & Gersdorff, New York.

Professor Kingsbury, Crucible Steel Co. of America, spoke on tool room problems at the January meeting of the Worcester, Mass., chapter American Society for Steel Treating, Thursday evening, Jan. 17, at Hotel Warren, Worcester. A discussion which followed was led by John Bath, John Bath & Co.; V. E. Hilman, Crompton & Knowles Loom Works; H. B. Greenman, Greenman Steel Treating Co., and H. Klaucke, Baldwin Chain & Mfg. Co. G. C. McCormick, Crompton & Knowles Loom Works, chairman, presided at the meeting, which was attended by about seventy members and guests.

Second Conference of Indiana Foundrymen

Technical Papers Featured Training for Foundry Work, Semi-Steel Castings and Importance of Metallurgical Control

IN the Michael Golden shops of Purdue University, Lafayette, Ind., the second annual conference of Indiana foundrymen was held on Jan. 17 and 18. During the first morning 44 foundrymen, representing the diversified industries of Indiana, made registration.

Conducted through the engineering laboratories of the University, the visitors were given opportunity to see the extensive work being carried on in connection with the United States Government and the State of Indiana. It was also of great interest to find that the engineering schools were working upon the chemical and physical effects of the major elements in cast iron. Experiments are being carried out with the idea of finding out what disposition a "chill" has on these elements. The tests are conducted on 1-in. square bars, 12 in. long, which are broken for transverse strength. The analyses are then made on pieces of the iron taken at five different depths, by the aid of a planer tool.

At 11 a. m. the foundrymen attended the convocation services held in the Eliza Fowler Hall. These services comprised the rendering of solos and duets by Fenwick Newell, tenor; Margaret Holt, soprano; Joseph Marks, violinist, and Rosamond Crawford, pianist. This entertainment gave the visitors some idea of the talent which is brought to the university for the benefit of its students.

Relation Between Education and Industry

The afternoon session was called to order by W. A. Knapp, assistant director, Engineering Extension Service, who introduced Dean A. A. Potter of the Purdue Engineering School. Dean Potter gave an address of welcome to the visiting foundrymen. He touched upon the increase in productivity of this country and likened its inhabitants to "tool-using animals." Reference was made to our growth in population in the past 30 years, and comparison with the increase in productivity was made. It was shown that approximately a 40 per cent increase in both had taken place.

An interesting summary of the growth of the institution, as well as the method of its upkeep, was given. For the benefit of the foundrymen, he stated that this institution is supported by the United States Government, the State of Indiana and by some few small endowments. With a reference to John Purdue, the founder, he passed on to the methods used in educating the students.

The main thought given was that technologists reason "why a thing is so," while a practical man reasons "how to make it so." It is the desire of the university to combine these two features; not simply by imparting knowledge but also by improving the brain of the student. To do this, the university divides its time, first training the student and then giving experimental work, performed either by the student or under his eyes.

A third function is that of extension work, by means of which the Purdue staff hopes to create closer cooperation between itself and the manufacturers of the State. In closing, the speaker hoped that the foundries of the State would take advantage of the university and this extension work, and obtain something which might be mutually beneficial.

Cooperation Needed for Success

In response to the address of welcome, W. D. Hammerstadt, president of the Indiana Foundrymen's Association, thanked the university for its attitude toward the members. He said that every foundryman owes it to himself to progress and, because of the expression of the University and the continuance of his society, a better feeling and closer cooperation might be expected of Indiana foundrymen. He felt that trade secrets would be totally eliminated and progress made. A reference was made to labor conditions in various foundries. By closer cooperation of the foundries in the State, he said, labor trouble will become partially eliminated, due to improved sanitary conditions and better buildings, brought about by combined thought of the members.

Costs seem to cause most of the trouble in the foundries today. He stated that less than 10 per cent know their real costs, 40 per cent estimate them, and 50 per cent guess at them. By not knowing their true costs, foundries eliminate fair competition, to their own harm. He further stated this society would have nothing to do with fixing prices, but would deal solely wth the advancement of its members on knowledge of costs and on the technology of cast iron.

Training for Foundry Work

Following this address R. E. Wendt, instructor in the foundry, Purdue University, gave a paper on "Selected Training for Foundry Work." A résumé of the paper follows:

Securing trained help is worrying most foundrymen. How to obtain this kind of help is a topic of great discussion, covering the subjects of vocational training and apprenticeship. The latter could not be advocated, due to its wastefulness. It would be better for foundries to institute vocational training, which would cheaply and systematically train men in the progress in the art of founding. The present schools of foundries in the country are of little benefit; they are merely playgrounds for the engineer, who must have some conception of foundry work; they do not teach foundry work as a foundryman must know it.

Only 108 hr. are given to foundry work in the curriculum at this school. It would therefore be impossible for any man to learn enough about foundry work to enter a foundry to advantage. The conclusion gave new ideas for foundry school training and stated that skilled labor must be either trained in vocational courses in a foundry or in a university which will "major" foundry work, so that a student may follow it for a full four-year course.

Prof. G. F. Buxton of the university gave a short talk on the "Foundry Foreman as a Teacher." He showed that there is an increase of unskilled labor, with a commensurate decrease of semi-skilled and skilled labor. A blackboard talk illustrated this problem. In concluding, he said that, to keep a man on the job, he must be kept making things, and then made to feel that the worker is a real producer; that things in the foundry must be made agreeable to the men; and that a man new to foundry work should not be made to commence learning his trade by shoveling sand. Along this line he stated that, even though the latter is essential, the most important part of the foundry to the worker is to keep him busy in the thought of production. Therefore a new man should be made to mold simple castings, and then later on to learn the "tricks of the trade."

Metallurgy in Cast Iron

The next paper was presented by E. J. Lowry, Hickman, Williams & Co., Chicago. The subject was "Metallurgy in Cast Iron," which covered progress in the art of founding, with its ultimate reflection in the wide limits of analytical specifications in gray iron castings, and the effect of these wide limits on the application of metallurgy in the gray iron foundry. Reference was made to the influence of the major elements and their balance. It was stated that great progress

in the technique of cast iron might be expected when a combination of a practical foundryman's ideas with the metallurgical phases were had.

Reference was made also to semi-steel and to test bars. With the former it was shown that the divergence of opinion over this name was warranted and that the name "high test cast iron" is not equal to the product made. It is felt that the name of semi-steel will continue to exist and it was therefore suggested that foundries be made to specify the percentage of steel in the mixture.

Referring to test bars, it was stated that they do not adequately perform their allotted function. Rather they will tell only the condition of the metal in the ladle. It was said that the greatest error incorporated in the pages of engineering books is the statement of strength of gray cast iron, for the use of engineers in ascertaining the strength of gray iron castings.

Manufacturing Steel Castings

In the absence of Mr. Woodhall of the National Car Coupler Co., Attica, Ind., Mr. Hullihan of that company read his paper under the subject of "Manufacturing of Steel Castings." This paper went into detail on the subjects of patterns, molding, metal, knock-out, cleaning, grinding and chipping, heat-treatment, finishing and the shipping of steel castings. The paper stated that great progress had been made in the steel casting industry in the past few years and that engineers have gone to an extreme in producing thin sectioned castings, where it was then thought that a large cross-section of metal was necessary in order to make the mold fill out.

Stress was laid upon the absorption of oxides during the melting operation in an acid process; because of this, great care must be taken in the selection of the raw materials entering the mixer. It was shown that the tensile strength of the operations of this company conformed to the following requirements: 65,000 lb. per sq. in., with an elastic limit of 40 to 50 per cent of the tensile strength, and with an elongation in 2 in. of 22 per cent and a reduction in area of 35 per cent.

In mentioning the heat treatment, it was shown that a coarse structure of steel castings is not refined at the critical temperature, but at a much higher one, and that the time element is a major factor in obtaining the structure required. In concluding, it was stated that things "moving lively" for material in constant motion spell success in the steel foundry.

"Semi-Steel" Castings

"Making Semi-Steel Castings," by George W. Gilderman, Dodge Mfg. Co., Mishawaka, Ind., was next presented. This paper covered the term semi-steel, which was shown to be much abused. It was stated that the strength of ordinary gray iron varies from 200 to 2700 lb. per sq. in. under transverse load and that it is not uncommon for semi-steel to break at 3600 lb., with exceptional bars registering 4000 lb.

Considerable stress was laid upon the determination of mixtures which limited the percentage of scrap at 40 per cent, one-half of which should be steel, the rest of the mixture being of a regular grade of pig iron. The position of the scrap in the cupola was stated to have a most important relation to the finished metal. In the case of heavy steel, the scrap should be charged on the coke and 8 in. from the linings, whereas, with light steel scrap, the operation is changed to mixing the scrap throughout the charge.

The use of alloys in semi-steel mixtures was advocated. Experiences with aluminum, ferrotitanium and ferrovanadium were given, ¼ oz. of the first alloy being used to each 100 lb. of metal. In the second case, 1 oz. is used and, in the third case, 2 oz. The object of this paper was to give a general idea of the methods used in actual practice and to show, by blackboard chalk talk, along with samples of castings, that there are no hard and fast rules which may be applied to the production of semi-steel.

Organization Meeting

At 7.30 p. m., Thursday, the foundrymen gathered in the assembly hall of the Michael Golden Shops for a smoker, W. D. Hammerstadt presiding. A tentative constitution similar to the Ohio Society was offered by the temporary board of directors. A discussion then followed, regarding the possibilities of the association, together with its aims and deals. It was finally decided that definite steps should be taken for the society's continuance; and that some arrangement should be made by which bulletins showing the costs of materials entering the gray iron foundry and the actual cost of production, in averages, should be assembled and sent out to the members monthly.

Considerable discussion arose over the suggestion that the secretary of the Ohio Society might be employed on part time work in the building up of the organization and in getting together the data necessary to make the society of value to its members. It was finally agreed that in some way some man should be selected to pursue this sort of work.

The present officers of the society, W. D. Hammerstadt, president; and A. J. Rumely of the La Porte Foundry, secretary, will continue as incumbents of their present positions. Henry M. Lane, Detroit, and Dan Avey, Cleveland, gave interesting information on society work and were enthusiastic regarding the possibilities of an Indiana conference.

Foundry Electric Furnace Use

On Friday morning J. D. Hoffman, head of the department of the Practical Mechanics, presided. An interesting paper was presented by W. J. Booth of the Booth Electric Furnace Co., Chicago, on the "Electric Furnace Product in the Foundry." This paper dealt more with the production of non-ferrous metals than with cast iron. Some of its phases, however, were connected with the production of gray iron, which was of great interest to all those present.

Following this paper E. G. Jarvis, Niagara Falls Smelting & Refining Co., Buffalo, presented a paper on the production of non-ferrous metals, which covered the aluminum, brass and bronze industry.

Motion Pictures and Demonstrations

Following these papers, four reels of motion pictures, showing production work in the foundry, were given by the Beardsley Piper Co., Chicago. George Furman of that company explained the action in the pictures as they went along. These pictures covered scenes in the foundries of the International Harvester Co., Chicago; Wilson Foundry Co., Detroit; Kedzie Foundry Co., Chicago, and the General Electric Co., Schenectady. They were of great interest because they showed the diversity of work to which a sand-slinging molding machine may be put.

In the afternoon the students of the foundry class of Purdue gave demonstrations in their foundry, by taking off a heat in the electric furnace, followed by a heat from a gray iron cupola. All the work performed was done by the students, with the exception of the tapping of the metal. Very simple castings were made, but these demonstrations tended to show the visitors the effect of a systematic training course on students of foundry practice.

The American Steel & Wire Co. is about to scrap 12 of the steam engines of its works at Worcester, Mass., to complete the electrification of the North and Central works, and also of the South works with the exception of the rolling mill and rod mill. A 10-year contract has been made with the New England Power Co., which generates its current in hydraulic plants on the Connecticut and Deerfield rivers in northwestern Massachusetts and southern Vermont and which also is tied up with the large steam power plants of the electric companies in Boston, Providence, Worcester, New London and other New England centers. The American Steel & Wire Co. is already taking considerable units of power from the company. When electrification under the new plan is completed, North works will receive 8200 hp. and South and Central works 7500 hp. The space now devoted to engine and boiler rooms is a considerable area, which is needed for manufacturing departments.

Steps to Improve Welding Instruction

Gas Products Meeting Reports Progress Toward Improving Standards of Welding Schools—Oil-Oxygen Explosion Hazards—Hydrogen as a Cutting Gas

THE Gas Products Association held its tenth mid-winter convention at the Blackstone Hotel, Chicago, Jan. 17, 18 and 19, with an attendance of 100. The organization is made up of active members, consisting of oxygen and acetylene gas producers, and associate members, comprising makers of welding and cutting apparatus and accessories. Since the last meeting of the association in June, 1923, there has been an increase of 37 per cent in the number of active members and 132 per cent in associate members. The membership roll now includes 48 oxygen producers, seven acetylene producers, 18 makers of welding apparatus, nine valve manufacturers, two cylinder manufacturers and four makers of gages and regulators.

In his opening address, the president, M. L. Goodrich, manager oxygen department, Swift & Co., Chicago, stated that the production of oxygen in cubic feet had increased in 1923 to the extent of 76 per cent over the output of 1922. He also emphasized the fact that in 1923 production was the largest in history, not excepting the war years.

Among various committee reports submitted at the meeting, that of the educational committee perhaps received the most attention. The chairman, H. S. Card, associate editor *Welding Engineer*, recounted in detail the efforts which have been made to raise the standards of instruction in welding schools. A survey was made of existing welding schools in various parts of the country and a list of 58 was compiled, including eight Y. M. C. A. schools, three Knights of Columbus schools, seven automobile schools, nine trade schools, eight colleges ten high schools and three schools conducted in job shops.

Each school is now being investigated and those which meet standards fixed by the committee will be placed on an accredited list. It is hoped that this list will cause sub-standard schools to improve their course of instruction. As inducements to schools to cooperate with the association to this end, the committee promises to help them obtain students interested in the welding course, to assist in obtaining positions for graduates, to help schools plan their courses of instruction, to offer schools in which the cost of instruction is a burden the very lowest quotations on welding apparatus and gas, and to advertise generally welding as a trade and the list of accredited schools. The committee has sought cooperation in connection with this work from the American Welding Society, the International Acetylene Association and the Compressed Gas Producers Association.

Explosions of Lubricating Oil with Oxygen

The oxygen-oil explosion hazard was the subject of an address by Mayo D. Hersey, physicist, United States Bureau of Mines, Pittsburgh. The speaker recounted the results of experiments which he conducted in cooperation with his colleagues at Pittsburgh. The origin of the inquiry was an oxygen explosion at the physical laboratory of Harvard University, following which Walter M. Wedger, Massachusetts state chemist, pointed out that there was no definite knowledge as to the limiting pressures and temperatures above which compressed oxygen and lubricating oil are capable of spontaneous explosion.

The United States Bureau of Mines therefore set out to discover why and when a few drops of oil in contact with compressed oxygen would explode with so much energy. For two months experiments were made with various grades of oil in contact with high pressure oxygen at a temperature of 60 deg. Cent., or 140 deg. Fahr., which was believed to be the temperature of an oxygen cylinder standing in the sunshine. Experiments at this temperature, however, gave negative results. When the temperature was raised, however, explosions took place at 240 deg. Fahr. and at higher temperatures, according to the grade of oil.

Suitability of Iron and Steel for Containers

An investigation was also made into the spontaneous ignition of metals in oxygen under pressure. It was found that whereas copper ignites with oxygen at atmospheric pressure at 1900 deg. Fahr., it still must be as high as 1600 deg. Fahr. to ignite spontaneously at 2000 lb. per sq. in. pressure. Pure iron, on the other hand, shows a marked drop in ignition temperature as the pressure is raised. At atmospheric pressure the spontaneous ignition point is 1700 deg. Fahr. and at 2000 lb. pressure, 1100 deg. Fahr. This suggests that steel and iron are not as suitable for manifolds, gas containers, etc., as some material containing copper.

In concluding his remarks, Dr. Hersey pointed out that a logical continuation of the experiments would be an investigation of lubricants to discover what lubricants are safe for use in the compression of oxygen and, secondly, what lubricants among those which have been found safe are the most satisfactory from the standpoint of wear. This work can be done, however, only if part of the expense equivalent to the salary of an assistant is borne by outside interests. The association expressed itself as favorable to lending financial support to this investigation and the question of sharing the expense will be taken up with the Compressed Gas Manufacturers Association at its next meeting.

Hydrogen as a Cutting Gas

Hydrogen as a cutting gas was the subject of a paper read by H. W. L. Porth, master car builder, Swift & Co., Chicago. Hydrogen, he stated, is a very safe gas to use as a fuel for cutting. Its explosive limits are given by the Bureau of Mines as 10 per cent to 66 per cent in air, or a range of 56 per cent. Hydrogen will not of itself explode. Acetylene will, if existing in sufficient volume and under sufficient pressure, explode of itself, that being the reason that acetylene must be held under pressure in solution in a sponge filled drum. It is necessary to handle acetylene much more carefully than hydrogen. The cost of using hydrogen equipment for cutting compares favorably with the cost for acetylene.

With reference to the cleanliness of the cut, he stated that no gas cut is comparable with a shear cut in good appearance, but hydrogen cutting more closely approaches the straight clean cutting by shearing than cutting with other gases.

His experience indicates that greater speed is possible with the use of hydrogen than with another fuel gas commonly used for cutting, the difference being approximately five per cent in favor of hydrogen. One of the deciding operating advantages in using hydrogen is the fact that rust and scale, usually present on any steel to be cut, has little or no effect on the cutting torch or the rate of cutting. In other common fuel gases more trouble is encountered on this account. Mr. Porth explained in detail the equipment required for cutting with hydrogen and the details of operation. He also listed a number of purposes for which hydrogen is especially adapted because of the great depth that can be cut with it as compared with any other fuel gas.

The special welding code committee, of which L. W. Hench, president American Oxygen Service Co., New York, is chairman, reported that the American Engineering Standards Committee had decided that it is not advisable to establish a welding code now.

Willard Foster, president Tulsa Oxy-Hydro Co., Tulsa, Okla., speaking as chairman of the employment service committee, mentioned practical ways and means which the association can employ to bring welders and employers together.

Exhibits of welding and cutting apparatus were shown by the Bastian-Blessing Co., the Imperial Brass Mfg. Co., and the Torchweld Equipment Co., all of Chicago. An apparatus group conference was held on Jan. 18, this being the first separate meeting of the apparatus manufacturers belonging to the Gas Products Association.

Cutting Metals with Hydrogen Gas

Equipment Used and Methods of Operating It—Fields of Usefulness Enumerated

BY H. W. L. PORTH*

THE same kind of equipment is used for cutting when hydrogen serves as the fuel gas as when acetylene is used, except that it differs from it in kind. Any ordinary cutting torch can be used for cutting when hydrogen tips are used. These can be obtained from the apparatus manufacturers.

The hydrogen and oxygen regulators are exactly similar as to the pressures required. They differ in that the hydrogen regulator has a left-hand nut, with which to attach it to the gas cylinder, while the oxygen regulator is equipped with a right-hand nut to attach it to the gas cylinder. This serves as a safey measure to prevent using hydrogen regulator on an oxygen gas cylinder and vice versa. The high pressure gages, 0 to 3000 lb., are the same on both regulators. The low-pressure gages are 0 to 50 lb. for hydrogen regulator and 0 to 500 lb. on the oxygen regulator. In addition to this, we use a left-hand nut on the hydrogen hose and solder a left-hand threaded brass nipple to the hydrogen regulator, so that the gas hoses cannot be attached to the wrong gas opening.

Operating the Oxy-Hydrogen Cutting Torch

The method of operating the oxy-hydrogen cutting torch is the same as with any other fuel gas, except in the regulation of the flame after the gas cylinder valves and the regulators are opened. The hydrogen is turned on at the torch and the regulator adjusted to the proper pressure for cutting, according to charts furnished by the apparatus manufacturers. These pressures are usually 5 to 10 lb. The hydrogen is then ignited.

Then the oxygen is turned on, and the flame adjusted as follows: The oxygen supply is controlled through the preheating valve, with the torch held about 2 in. above a cold steel plate, until the black spot in the flame disappears. In the adjustment the torch must be made to approach the steel plate so that the operator can be certain that the black spot has been eliminated from the flame. This is a very essential adjustment to good operation. The oxygen regulator is then adjusted to the proper pressure for cutting the thickness of metal.

One of the decided operating advantages of using hydrogen is the fact that rust and scale that is usually prevalent on any steel to be cut has little or no effect on the cutting torch or the rate of cutting. In other common fuel gases more trouble is encountered from this condition.

When cutting is discontinued for the day the regulators should be closed and the hoses disconnected from the regulators. This avoids any possibility of gas leakage through defective valves building up explosive mixtures. This safety precaution should be taken, regardless of the kind of fuel gas used.

One of the decided advantages of using hydrogen over any other fuel gas is the great depth that can be cut with it as compared with any other fuel gas. This would seem to indicate a wide demand for the process in steel plants, heavy foundries and scrap yards.

Some of the uses for which hydrogen is adapted would be:

1. For lead burning in storage battery manufacturing plants and battery repair shops.
2. For lead burning in chemical industry, where lead lining of steel and wood tanks is quite widely used.
3. For welding thin sheets up to 16 gage in general repair work. We have successfully welded 12 gage.
4. For cutting purposes universally, where a portable gas cutting process is desirable, such as:

(a) General cutting in connection with locomotive repairs at either large shops or roundhouses. Much time and labor can be saved in cutting boiler side sheets, flue sheets, tubes, flues, crown bolts, staybolts and rivets. Old staybolts can easily be cut out, new ones applied, cutting them off, ready for heading over.

(b) In general welding of any kind for beveling the parts to be welded or cutting out the material, to permit of welding thick sections.

(c) Cutting risers and gates from castings on the foundry floor before castings are cold.

(d) In forge shops, for auxiliary cutting preparatory to forging, saving both time and labor.

(e) Beveling pipe preparatory to welding pipes in oil and gas lines, cutting entries in a constructed line to weld an auxiliary line to the main.

(f) In scrap yards, for cutting heavy pieces into more merchantable sizes and in dismantling fabricated material for the separation or classification of scrap.

Ever since the introduction of gas-cutting processes there has been a more or less attitude against the use of hydrogen. Even as long as ten years ago the writer recalls the "dangers" of flashback that were related regarding the use of hydrogen. The use of flashback tanks and all that was held up as of vital necessity to the safe use of this gas. This is all an effort to discourage the use of hydrogen. As related previously, the use of hydrogen is even more safe than other much-heralded gases. We have used it continuously for nearly two years in our repair shops, with continued good success and economy.

*Master car builder Swift & Co., Chicago. From a paper read before the Gas Products Association in Chicago, Jan. 18. As related in the report of the meeting in another column, Mr. Porth discussed also the safety, cost, cleanliness of the metal cutting and the speed realized in the oxy-hydrogen process.

Domestic sales of oak leather belting for December are reported by the Leather Belting Exchange, which represents about 60 per cent of the total product, to have been 320,547 lb., valued at $558,393, or an average of $1.74 per lb. These figures compare with 347,202 lb. in November, valued at $642,324, or an average of $1.85, and with 451,957 lb. in December, 1922, valued at $784,597, or an average of $1.74 per lb.

The 1922 steel output of Czecho-Slovakia amounted to 721,066 tons, of which 95.7 per cent was open-hearth and 1.45 per cent basic Bessemer. The total output represents 58 per cent of the quantity produced in 1913 at the steel plants situated in what is now Czecho-Slovakia.

An examination for junior topographic engineer will be held throughout the country on April 23 and 24 to fill vacancies in the Geological Survey. Information and application blanks may be obtained from the United States Civil Service Commission, Washington, or at the post office or custom house in any city.

Molding Sand Problem in the Foundry

Important Bearing of Varying Physical Characteristics— Vibratory Test as a Dependable Method for Determining Them

BY EUGENE W. SMITH

GOOD equipment, good metal and good sand, properly cared for, should prove a profitable investment in any class of foundry work. The latter is probably the most neglected and carelessly handled material in foundry practice.

Molding sand is probably not treated alike in any two foundries. In the past we have used the old method of "squeeze" and "feel" to determine our sand conditions and in our selection of new sands. Nothing having been devised which might be used in our daily practice to assist us in avoiding losses, caused directly or indirectly by our sand conditions, every shop varies in its method of sand distribution. Very often this matter is simply left to the whim of the molder or laborer.

In some foundries very little attention is paid to the amount of new sand distributed, whether 5000 lb. or 25,000 lb., and very often new sand is distributed whether needed or not, until trouble occurs from blow, cold-shut, etc. Then again, it is stopped until the reverse condition, "weak" sand, is caused and the resulting losses, crush, scab, cut, rough finish, drop-outs, etc., occur.

Let us ask ourselves these questions:

Have we had anything by which we could determine our daily sand conditions?

Have we had any method or appliance which would guide us immediately to correct our sand troubles?

Have we ever had any measurable connection between our losses and our sand conditions?

Have we ever had any means of communicating with each other intelligently as to the suitability of our new sands to the many different classes of castings we make?

Have we any means of determining that the sand we now use is the right one for our work, each of us in his own particular line?

If I should tell you I have had success in my particular line by using certain molding sands and gave you the proportions of each which I now use and obtain good results, would you consider it good foundry practice to order the same sands and use the same proportions for heavy machinery or light hardware, that I use for valves and fittings? Have we been able to apply chemical analysis in the foundry successfully in controlling our daily sand conditions and reduce losses caused by sand?

Having determined the characteristics of a sand—bond, clay, silica content, permeability, etc.—how can we use these determinations in the foundry proper to keep the sand which is in use in proper condition and reduce losses? Can you write to a shipper and specify the exact proportions of bond and silica to send you? If you are a sand shipper, can you comply with such a request, if made?

Losses Due to Sand

Answer the foregoing questions to yourself and you will conclude that we have all been groping around in circles. Let us make a fresh start and strike at the root, beginning with the sand in the foundry itself. First: Determine what proportion of our loss is due to sand conditions, either caused by the abuse of our sand or some unfavorable characteristic of the sand. This leads up to two more questions:

How can molding sand be abused to affect our losses?

What characteristics of sand would increase our losses?

The value of a perfectly good molding sand may be affected by abuse in many ways, a few of which are:

New sand stored in the open loses its natural bond, shortening the life of and weakening it.

Sand is brought to the foundry, frozen or wet, and is dried out by the use of waste metal (sometimes perfectly good metal is used). This practice also destroys the bond and weakens the sand.

Sand which is air-dried for any length of time, whether new or old, loses its bond quality, and if used before the "temper" has been restored, is very weak.

Weak sand is the source of many losses: Drop, cut, scab, rough finish, cold-shut, run-outs, strain, etc. Also, due to this weakness, more water is required, which causes blow and slaggy castings, and in the case of light work hardens the metal.

Answering the second question: All molding sands contain widely varying compositions of silica and clay and take on the characteristics of the "rock" from which they came. Many other elements or silicates may be present, but have no essential value for molding purposes. For example: Red sands containing silicates of iron may be found suitable for any class of molding, from the heaviest machinery castings to the lightest of hardware, also for the non-ferrous metals, even to gold and silver. Yellow sands, containing silicates of aluminum, may also be found, which would give equally as good results. The man in the foundry is not necessarily interested in the chemical composition of the sand. He is vitally interested, however, in its physical qualities. He must have a sand which will give him the desired finish suited to the class of castings he is to produce. In making this selection he must be guided by the grain size. He is at the same time interested in the permeability of his sand in order that he may be assured of the proper escape of gases generated in the mold by the temperature of the metal.

Permeability is also governed by the grain size, together with the fineness and quantity of the bonding elements, which fill in between these grains. Excess bond also destroys permeability.

The silica, as separable by water, in a great many of our new sands is divided into two parts. The finer or upper layer (which I have named "silt"—for the want of a better term) will also destroy the permeability of the sand, if in excess of 15 per cent.

Heat Resisting Qualities

The foundryman is also interested in the heat-resisting qualities of his sand, which are governed by the character of the grains, which in turn is governed by the character of rock from which it comes—silica

(*Continued on page* 340)

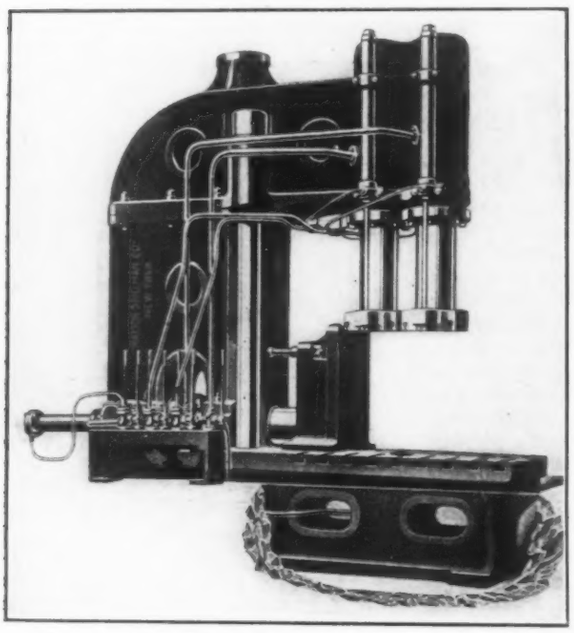
EUGENE W. SMITH, who recently made this address before the Detroit Foundrymen's Association, is the father of the vibratory test for molding sand. For over a year he has used the test daily in the large foundry of which he is superintendent at the Crane Co. plant, Chicago. The test, which consists of placing samples of molding sand in small bottles of water and then putting them on an electric vibrator so that the bond and silica contents will be separated, enables Mr. Smith to regulate his molding sand closely and thereby materially to reduce his scrap losses.

Flanging Press of Built-Up Type

A line of hydraulic plate-flanging presses of the built-up type, the main frame being made up of sections securely bolted together, has been placed on the market by the Watson Stillman Co., New York. The machine is available in four sizes, with total pressures on the vertical cylinders of 150, 200 and 300 tons.

Standard practice heretofore has been to make the main frame in one single casting, a design said to have inherent faults, many of which are overcome in the built-up type of frame. It is emphasized that since the casting is only exposed to compressive stresses it can be made in lighter sections. The tension strains are taken up by two heavy columns or bolts which secure the two parts of the main frame together and the spring is reduced to a minimum.

A feature of the design illustrated is that in case



Hydraulic Plate Flanging Press With the Main Frame Made Up of Sections Bolted Together

repairs are necessary or replacement is required of the main cylinders, it is only necessary to renew that section. Another feature is that the return stroke of the main rams is effected by draw back cylinders below the top of the frame, which reduces the overall height of the press making it possible to install it in restricted quarters, and permitting the mounting of a swing crane on the top of the press to facilitate the handling of materials.

The presses are usually fitted with two vertical upper rams, one lower vertical ram and one horizontal ram. The main cylinders are connected through special filling valves to the main pressure line, an arrangement intended to increase the speed of the rams and at the same time reduce the consumption of pressure water.

Plants Busy in the South

BIRMINGHAM, ALA., Jan. 21.—All radiator and heating apparatus manufacturing concerns using Southern pig iron are in full operation, including stove and range manufacturers. The radiator plant in Birmingham has had an extraordinarily lengthy season of activity.

The Ingalls Iron Works Co., steel fabricator, is adding a night force to care for business that has come in recently, labor heretofore working at Fairfield coming into the city and taking up the steel work. The Ingalls company received instructions to hold up a little on structural work being done for a by-product coke oven plant in Mexico because of the revolution. Several contracts of more or less size are in hand and announcement is made that much more business is assured for the company.

Shortening of Hours in Steel Plants

Sweeping changes in the hours of labor in the steel industry were warmly commended by Paul Kellogg, editor of *Survey*, in a luncheon address Jan. 14 before members of the Hungry Club, at the Fort Pitt Hotel, Pittsburgh. This he adduced as evidence of the progress that was being made in the establishment of a higher standard of living and in the effort toward human conservation. He quoted freely from the report on the elimination of the 12-hr. day in the steel industry in THE IRON AGE of Jan. 3, last. His subject was "The Changing Industrial Frontiers and Their Relation to Pittsburgh."

Either this country would make toward democracy or toward the restoration of the old European order of classes, he said. People of this country, descendants of the Puritans, Pilgrims and revolutionary folk, were by inheritance rebellious, with a strong strand of the pioneer in the blood. The first thought of the pioneer was of security and that desire still is strong. While the setting up of standards of safety, State workmen's compensation laws, the elimination of child labor and of night work for women were encouraging developments in the pursuit of security, the speaker declared that still ahead were the problems of unemployment and old age to be solved. Men work well either to acquire wealth or through fear of losing their positions. It has been observed that men work harder as a rule to hold what they have than from any other motive and the speaker argued that this might be turned to good advantage by the employers of labor, through furthering the movement toward better living conditions, of which workmen had a real taste during the war period and its high income.

Comparative Coking Tests

Two coking tests of new types of ovens are discussed in *Stahl und Eisen* for Nov. 8, 1923, by Dr. Engler, coke-inspector of Waldenburg in Silesia, according to *Engineering*, London. The first series of tests concerns a continuous double-shaft oven, put down at Glatz by Heinrich Koppers, of Essen. The two chambers are 9 m. high, 2 m. long and about 0.35 m. wide. The combustion chamber is common to the two shafts and the heating with producer gas is so conducted on the regenerative principle, that the gases are drawn downward for half an hour and then upward for the next half hour; the rate of working and other features are adjustable. The new oven gave a good coke in very satisfactory quantity and a good yield of by-products; the tar and gas yields were higher than with the old coking plants, but the yields of ammonia and of benzine did not come quite up to that standard; on the whole the results were distinctly favorable to the innovation.

The second series of tests was also made on a Koppers oven which had been modified, on the strength of experience gained in America. The chief change made was that the width of the oven was reduced from 500 mm. and 450 mm. to 350 mm., and the advantage gained was that the coking-time, 48 hr., with Otto-Hoffmann ovens, and 36 hr. with other Koppers ovens, was reduced to 18 hr. and even 12 hr. It had been found in America that with the reduced time and oven-width a coke was obtained which proved more economical in blast furnaces. Analyses taken during the coking operations showed that after 9 hr. a change in the composition of the gases became very distinct, and that the coke was quite mature after 12 hr.; 12-hr. periods were then adopted for long runs of the experimental oven which had been added to a bank of 30 ovens at Waldenburg. The coke was more porous, but quite firm; the coal charge was loosely filled in and not rammed down.

The trade conference which was to be held in Mexico City, Feb. 11 to 15, has been postponed because of the present situation in Mexico. When business conditions are more normal the holding of the conference will be again taken under consideration, according to the American Chamber of Commerce of Mexico.

Increase in Pig Iron Costs in Decade

Element of Transportation Has Added Greatly to Expense of Assembling Raw Materials for Blast Furnace Use

BY RICHARD PETERS, JR.*

THE cost of elements entering into pig iron is reflected in every finished form of ferrous materials. This fact, coupled with the oft-repeated statement that pig iron is the barometer of trade, suggests an interest in an analysis of the factors which control the cost of its manufacture. That these elements are not always reflected in the market value, or the selling price, is an unfortunate commentary, which, however, is not peculiar to this industry alone.

The primary factor entering into the cost of producing pig iron is the value of the raw materials, which, for convenience in comparison, are divided into ores (or metallic mixture), fuel and limestone. To these basic elements must be added "cost above materials," which consists of labor, repairs, supplies, relining, superintendence, administration, taxes, insurance and capital charges. The division of these costs above those of the materials varies considerably with individual manufacturers, but are fairly uniform in their total for plants of similar construction and capacity.

For the moment let us consider only the raw materials, and if we analyze the cost of these commodities it will be readily shown that their value is made up almost entirely of labor and of transportation. In the case of iron ore it is evident that the cost of production of pig iron is affected by the quality of the ore, not only through the amount of its iron content, but also with respect to its physical characteristics. The ore may be rich in iron, but refractory, and a magnetite ore will require more pounds of fuel per unit to smelt it than will a hematite. On the other hand, a low grade ore may be self-fluxing, so that its value in the furnace may compare favorably with an ore much higher in metallic contents. It is the common practice of the trade to negotiate for iron ore on the basis of its unit value. As the ore increases in richness its value is enhanced, not only per ton, but also per unit of iron contained.

By far the largest bulk of the ore used is shipped in its original form as produced from the underground mines or open pits. There are a number of ores which are naturally low in iron, but on account of the cheapness in winning them they can be beneficiated to advantage at their producing points by concentrating, jigging or washing. It follows that these processes tend to add to the cost of the ore, but at the same time they increase its unit value and reduce the smelting costs.

The element of transportation of iron ore with a few exceptions enters into nearly all pig iron manufactured in this country. A few small furnace units have for many years enjoyed switching rates from ore deposits in their close proximity, but the most notable exception is in the Birmingham district, where ores of medium iron content are so situated with relation to fuel and limestone that they bear relatively low transportation costs.

In the production of coke the same line of reasoning applies. If the coke is made in beehive ovens at the mines it bears its freight costs after it has been manufactured, but in the case of fuel manufactured in proximity to the furnace plants in by-product ovens it is obvious that there must be transported slightly more material than is in the finished coke.

In beehive coke manufacture some coals—for example, those in the Connellsville district—can be charged into the ovens without any preparation, while in other districts it is necessary to wash the fuel before it is adaptable for coking. This increases the cost of the fuel, not only from the labor required in washing, but from the loss of material which has already borne a portion of the mining expense. In the case of the by-product operation it is the practice to prepare the coal by crushing it uniformly, and here again labor enters as an important item in the steps of preparing material from the ground for its practical use.

Another factor of great importance is the ash content of the coke, as it follows that increase of ash over certain limits is immediately reflected into the cost of iron manufacture.

In the case of limestone, the least important of the raw materials, labor represents the major portion of the cost at the quarry, while frequently the item of transportation is the limiting factor for its value as a flux.

The direct labor charges very naturally fluctuate with the changes which occur with wage rates, but at a modern plant these charges are relatively so low with respect to other costs that they do not change as materially as do the other charges. It is self-evident that such items as interest on investment, taxes and other direct overhead charges are fixed, and such variances as might occur would be brought about by increases or decreases in tonnage produced.

Increase in Cost Factors

The groundwork of blast furnace costs may then be built up from the foregoing remarks, and it will now be proper to discuss how the principal cost factors have pointed to a permanent increase in the last decade. For the purposes of investigation, actual costs in the several districts would naturally be the most illuminating exhibit. However, in order to get at the true conditions it would then be necessary to have average costs for each entire iron manufacturing district, as it may well be understood that individual figures cannot consistently be considered as truly representative of the whole. Certain local advantages that one plant may have over its neighbor are naturally reflected in the cost sheet, and as it is not proper to exhibit confidential figures, our purposes may be best served by taking certain well recognized average data in each case.

An examination of numerous cost sheets of the several iron producing districts discloses the fact that over a period of years the combined cost of the ores and fuel necessary to make a ton of pig iron bears on an average about 80 per cent of the total cost. Recognizing this fact, it is possible to take these two items out of the cost sheet and use them as a basis of proof that pig iron costs have shown an upward tendency over the past decade.

It will be understood then that we are able to start with definite average data as regards the two essential raw materials, and it may be recognized that the lime-

*Partner, Robert C. Lea & Co., Philadelphia.

stone and labor costs have gone up in the same proportion with those of the major raw materials. The cost of supplies, refractories and the materials for repairs are all represented by substantial advances in value over the past decade. As this article is intended to cover the subject in a broad sense, it is obvious that detailed examinations, while interesting, are not within its scope.

Buffalo and the Valley Districts

The practice in what is commonly known as the Valley district and that of Buffalo are so similar that they may be grouped together. Both these producing points depend on Lake ore as their source of iron-bearing raw materials, and the mixtures are usually figured on the use of approximately 60 per cent of Mesabi and the balance of Old Range ores, together with such sinter made from flue dust, or scrap as it may be economical to use.

A large proportion of the fuel in both districts comes from the Connellsville region, either in the form of coal for by-product ovens or as straight beehive coke. Some West Virginia coal is also used, but this is principally in the Youngstown district. The by-product coke oven, as a medium for preparing fuel for the blast furnace, supplies the majority of this raw material in both the Buffalo and the Valley districts, and the development of this type of oven has been very marked in the past ten years in the regions under discussion.

In the case of limestone, Buffalo, in common with other Lake front furnaces, receives its limestone by barge from Lake points, while in the Valley district the stone is quarried locally. The labor rates in the two districts may properly be classed practically the same. Assuming equivalent mixtures for the two districts, it will readily be seen that the transportation costs will be the factors which cause any net change in their respective figures. Practically all the furnace interests in the districts under discussion control their supply of iron ore, either directly or through affiliated mining companies. Despite the fact of the apparent advantages of these arrangements, it is fair in considering the cost of raw materials at the particular furnaces to give the market value or season's selling price as the basis of computing costs, for it must be remembered that in many cases the same interests are not only sellers of pig iron, but iron ore as well.

As stated in the introduction to this article, the transportation charges bear a large measure of the direct costs of ore, and this is particularly true with respect to the product from the Lake Superior mines. A decade ago the upper rail rate on iron ore to the Lake shipping ports was 30c. to 60c. a ton on Old Range ores and 60c. from the Mesabi Range. By 1921 these rates had reached a peak of 75c. to $1 a ton, while today they range from 69c. to 91c.

Lake rates based on the season's contract figures ranged from 35c. from Escanaba to 50c. a ton from the head of Lake Superior in 1912 to the high point in 1920 of 95c. and $1.20 from the ports mentioned. At the end of the 1922 season these rates were established at 65½c. and 83c. These figures will show that the delivery charges to the lower Lake ports from the Mesabi district, for example, have increased from $1.10 per ton in 1912 through a high point of $2.10 to the present figure of $1.74 per ton. As the prices of ore are based on delivery at the lower Lake ports, it will be understood that the above changes in freight rates are reflected in the season's prices. In the case of the Valley furnaces the line haul must be added to the Lake side price of ore.

The freight rate from the ports to the Valley districts was 56c. in 1912 and has advanced to the present rate of 90c. The result of this advance is equivalent to a net added freight charge of 65c. per ton of pig iron produced in the Valley district.

DELIVERED PRICES OF ORE MIXTURE AND COKE FOR ONE TON OF PIG IRON AT BUFFALO AND VALLEY POINTS, 1912-1922

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Cost of mixture, consisting of 60 per cent Mesabi and 40 per cent Old Range ores at Buffalo	5.53	6.61	5.53	5.47	6.86	9.71	*10.41	10.66	12.56	10.66	9.71
Cost of 1.1 tons of coke at Buffalo	4.80	4.70	3.94	3.94	6.22	*†12.25	*†9.13	7.90	†15.88	7.80	†11.57
Total cost of ore and coke at Buffalo	10.33	11.31	9.47	9.41	13.08	21.96	19.54	18.56	28.44	18.46	21.28
Cost of mixture, consisting of 60 per cent Mesabi and 40 per cent Old Range ores at Valley furnaces	6.59	7.68	6.59	6.54	7.92	10.91	*11.76	12.01	14.17	12.30	11.50
Cost of 1.1 tons of coke at Valley furnaces	4.29	*4.06	3.22	3.22	5.50	*†11.54	*†8.33	7.02	†14.83	6.57	†10.40
Total cost of ore and coke at Valley furnaces	10.88	11.74	9.81	9.76	13.42	22.45	20.09	19.03	29.00	18.87	21.90

*Average prices of materials due to changes by Government agencies.
†Average freight rate based on changes during year.

The price of Connellsville furnace coke displayed more violent market fluctuations during the period in question than in any other during the history of the industry. Labor rates have all been very materially increased to a point where the costs obtained just prior to the outbreak of the world war are now but a memory. At the same time the freight rates on coke have advanced in the case of Buffalo from $1.85 per net ton in 1912 to $3.46 at the present time. Based on 1.1* tons of coke to the ton of iron, this represents an increased freight toll of $1.78 per ton of pig iron. In the case of the Valley district the coke rate has advanced from $1.35 a net ton to $2.39 at the present time, or equivalent to $1.15 per ton of pig iron.

Using the season's selling price of the ores mentioned over the period of years under discussion and considering an accepted figure of 1.9 tons of ore to the ton of pig iron and taking the delivered average coke prices on 1.1 ton ratio to iron over the same period, we will arrive at the delivered cost of ore and fuel at Buffalo and at the Valley points.

Eastern District

The Eastern pig iron producing district is generally understood to embrace Pennsylvania east of the Susquehanna River, New Jersey and the eastern portion of New York State. In the Pennsylvania portion of

*A coke ratio of 1.1 tons of coke per ton of pig iron is used in this article and in the table, although at times the amount of coke used has exceeded this amount.

this district the conditions have probably shown more changes than in any other with respect to the ore mixtures, and this condition has been brought about in a large measure through outside influences. It will be understood at the outset that the New York and New Jersey furnaces depend in a large measure on their own local ore supplies, which are contiguous to the furnace plants. The eastern Pennsylvania furnaces having no adequate supply of their own are forced to make up their mixtures on the most advantageous basis offered by market and other conditions.

For many years prior to the outbreak of the world war the Eastern district furnaces used large portions of Lake ore in their mixtures, by reason of fairly low rates from the Lake ports. Such local and foreign ores as were available were added to the mixtures, but it may be safely asserted that the best grades of foreign ores did not come to this country, as there was such a demand for them in the European iron-producing districts.

The use of Lake ores decreased steadily until the second year of the world war, when the imports of foreign materials were cut off, with the exception of ores from Cuba. By 1917 the use of Lake ores had increased in the East to over 50 per cent of the mixture, and this increased to 60 per cent in the following year. This condition maintained throughout the duration of the war and on through 1920 until the readjustment period, which started late in the fall of that year.

In 1921 it will be remembered that the furnace companies faced a difficult readjustment period necessitating radical reductions of inventory values. Up to this time the transportation items had not been considered except academically as serious factors in the pig iron cost structure, as they had been passed on with other increased items to the ultimate consumer. It became apparent that if the furnaces in the Eastern district were to survive drastic reductions would have to be made in freight rates on raw materials, and as far as Lake ores entered into consideration they could not be considered for use east of the Allegheny Mountains, with the exception of those which on account of their high manganese content were necessary for mixture purposes.

There has been, however, since the readjustment period quite a tonnage of Lake ore used in the East, but it represents stocks or commitments which were the result of the heavy demand during the period just before that of the readjustment, and in these cases the inventories on these ores had been marked down to a figure which made them comparable to offerings of other ores.

The European market was quick to take advantage of the opportunity to offer their best grades of ore at attractive prices per unit on the Atlantic seaboard, so that large quantities of imported ore have been used the past two years in this district. Hence the conditions today in the East are such that the mixtures are made up from ores imported from Scandinavia, Africa, Cuba and Newfoundland; from New York and New Jersey mines, to which are added such local Pennsylvania ores and sintered pyrites residue, together with mill cinder, roll scale, etc. At the present time these ores are used in almost as many varying mixtures as there are plants in the East.

To illustrate the advance in costs of ores in the East: In 1912 Old Range ores suitable for manufacture of foundry pig iron could be delivered at slightly over 8½c. per unit of metallic iron. Today this same ore would cost 15c. a unit. Local ores a decade ago could be had from 6c. to 7c. a unit delivered in Eastern points. Today these same ores would cost between 10c. and 11c. For example, ore rates from New York mines to the Schuylkill Valley have advanced $1 per ton of iron over this period. The required amount of coke to make a ton of pig iron at an average Eastern furnace point today would cost $8.55 per ton, as against $5 in 1912. Common labor has practically doubled over the past decade.

Due to the varying mixtures which have been employed at the Eastern furnaces and are now being used, it is difficult to make a comparative statement showing the advances over the past ten years, but perhaps a striking illustration of these changes is well represented through figures submitted to the Interstate Commerce Commission by the Eastern blast furnace interests early in 1922. It was shown then that over a period of ten years the Eastern district had used as an average ore mixture 40 per cent of Lake ore, 21½ per cent of New York State ore, 8¼ per cent of New Jersey ore and 30¼ per cent of imported ore. These figures disregarded mill cinder, sinter and other iron bearing materials which would ordinarily replace the local ores. The data submitted to the commission by the Eastern furnaces showed that the cost of coke and ore to make a ton of iron delivered to a typical Eastern furnace had advanced from $13.50 in 1912 to $23 in 1922. With the European market anxious to do business on the Atlantic seaboard and taking today's market prices of local ores and Connellsville coke, the delivered cost of ore and coke per ton of iron would be between $18 to $19 per ton of pig iron at the end of 1923.

Virginia District

The conditions in the Virginia district have been somewhat unusual over the period in question, as the factors which led to an advance in costs were largely those brought about by increased transportation. The pig iron industry was built up by exceedingly advantageous freight rates, due to the fact that the carriers realized that while Virginia had the raw materials for making iron in close proximity, yet as an agricultural State it could not possibly consume but a small portion of its normal pig iron output. These low rate factors had been practically undisturbed for many years, and while the rates were not as low as they were in the Birmingham district, yet they were comparable when the mileage was taken into account.

In 1917 the railroads serving the Virginia territory advanced the coke rates by 100 per cent, and while this advance was vigorously opposed by the furnace interests, yet they were unable to sustain their position, due to the fact that the high price then ruling for iron weakened their arguments. The carriers contended that they had for many years suffered a loss on the transportation of coke, and the additional advances made under the Railroad Administration subsequently increased the Virginia coke rates to a point where they were nearly four times what they had been prior to 1912. The local ore rates were also sharply increased, and with high labor and mining rates, particularly in the coke fields, by 1921 the total cost of raw materials to make a ton of pig iron, excluding limestone, was approximately $21.50, as compared with $11 in the early part of the period under discussion.

When the depression of the pig iron market in 1921 was at its height the Virginia furnace interests found their costs so high that it was impossible for them to move their product, so that in the fall of that year every blast furnace in the State was idle. This situation was forcibly put up to the carriers, with the suggestion that drastic reductions in raw materials would have to be made if the industry could be expected to survive. Late in 1922 the executives of the railroads serving Virginia compromised with the furnace companies in that State by putting into effect raw material rates which were fair, from the standpoint of both revenue to the carriers and the blast furnace cost sheet.

It must be understood that with one or two notable

exceptions the local Virginia ore supply has been so depleted that it is necessary for the existence of the furnaces in that territory to draw on outside ore. Consequently, they have used varying proportions of Lake and foreign ore, together with such sintered pyrites residue as has been available. It may be then realized that the necessity which has forced the use of these outside ores in the Virginia district has added to the cost of producing iron by reason of freight rates involved. It may be asserted that, on an average, costs at Virginia furnaces do not vary much from those of their competitors on the Atlantic seaboard, as the costs of ore and coke alone in typical Virginia furnaces at the present will range from $19.50 to $20.50 per ton of iron.

Alabama District

The Alabama district is practically wholly self contained, in that the individual operating companies do not depend on independent mining companies for any of their raw materials. They do not even have subsidiary mining companies, but produce their raw materials themselves, charging the actual costs direct to the blast furnaces. It will, therefore, be understood that the furnace costs in the Alabama district are directly dependent on such fluctuations of labor as occur from time to time, whereas in the majority of the other iron producing districts raw materials are purchased either for a definite period or as a fixed tonnage. In the Birmingham district the monthly cost of the raw materials at the blast furnace will be dependent on the actual producing figures. In several cases the companies maintain their own transportation systems, while others control short line railroads which deliver a portion of their raw materials, but increased freight rates have had their effect on costs in the same proportion as in other districts.

Another very important feature of this district in addition to a short transportation haul is the fact that the climate of the region permits a continuous operation throughout the year for the mining industry. It is, therefore, not necessary for the furnaces in this district to have large amounts of capital tied up in raw materials. This naturally is in direct contrast with those companies which have to figure interest on stored raw materials as a part of their fixed charges. Then again it must be taken into consideration that the basic wage scale is usually on a very much lower plane in the South than it is in other districts. Negro labor predominates, and while it is possibly quite true that the turnover is much greater in the Southern field, yet the cost per hour has been well maintained considerably lower than in other communities.

It is an interesting commentary that in the past fifteen years there have been no new blast furnace plants built in the South. It is true that existing plants have been remodeled, and in a number of instances the annual tonnage per furnace has been increased, and, on the other hand, the Southern iron masters have improved their methods of mining and preparation of their raw materials and have made great strides in operations and in furnace practice. A large portion of the coal has to be washed before coking, and in underground mining each year sees material carried further from the pit mouth or tipple, and it necessarily follows that the mining costs increase. The figures of approximately $10 and less of a decade ago for producing iron have been increased 75 per cent to 100 per cent, and the general level of manufacturing costs will continue to be on a comparatively higher plane.

Summary

While the old law of supply and demand must always regulate the market value of materials and of labor, it must be remembered that this country has moved on to a higher plane of values and of living conditions. We may no longer look for cheap labor and low costs of sustenance. Transportation is now so controlled by Government agencies that special rate making such as used to be the practice is no longer tolerated, and transportation rates must bear their relation to the cost of service.

We must today consider that to a large extent all factors which make up the cost of producing pig iron have been liquidated to a plane comparable with prewar values, considering changed conditions. The notable exception to this is transportation costs, but until the railroads are able further to lessen their cost of service by greater economies in operation we cannot look for much relief from that standpoint. Every item that finally goes into the manufacture of iron has a higher market value today than it had a decade ago.

But in considering the conditions which affect the cost of manufacturing pig iron in various districts, improvements from the engineering standpoint must not be overlooked. Remodeling of blast furnace plants, in some cases representing complete rebuilding, with a consequent higher output per day, has materially affected operating costs, which should be downward. Improved practice and more careful study, particularly of fuel consumption, have brought about great reductions in the ratio of coke to iron produced. It may be safely asserted that changed conditions, particularly with respect to the general raising of the level of freight rates, have stimulated the furnace managers to economies which had not previously been considered necessary; hence the well fitting application of the old adage that it is an ill wind that blows nobody good.

The consumers of iron must not take too seriously temporary conditions caused by overproduction, resulting in prices which do not bear the proper relation to manufacturing costs. This state of affairs has prevailed and will always maintain until production and demand are balanced, but both the present and future outlook of this country do not point to a return of prewar conditions, with their consequent bearing on costs.

Scrap Prices at Chicago: *Steel Knuckles and Couplers, per Net Ton*

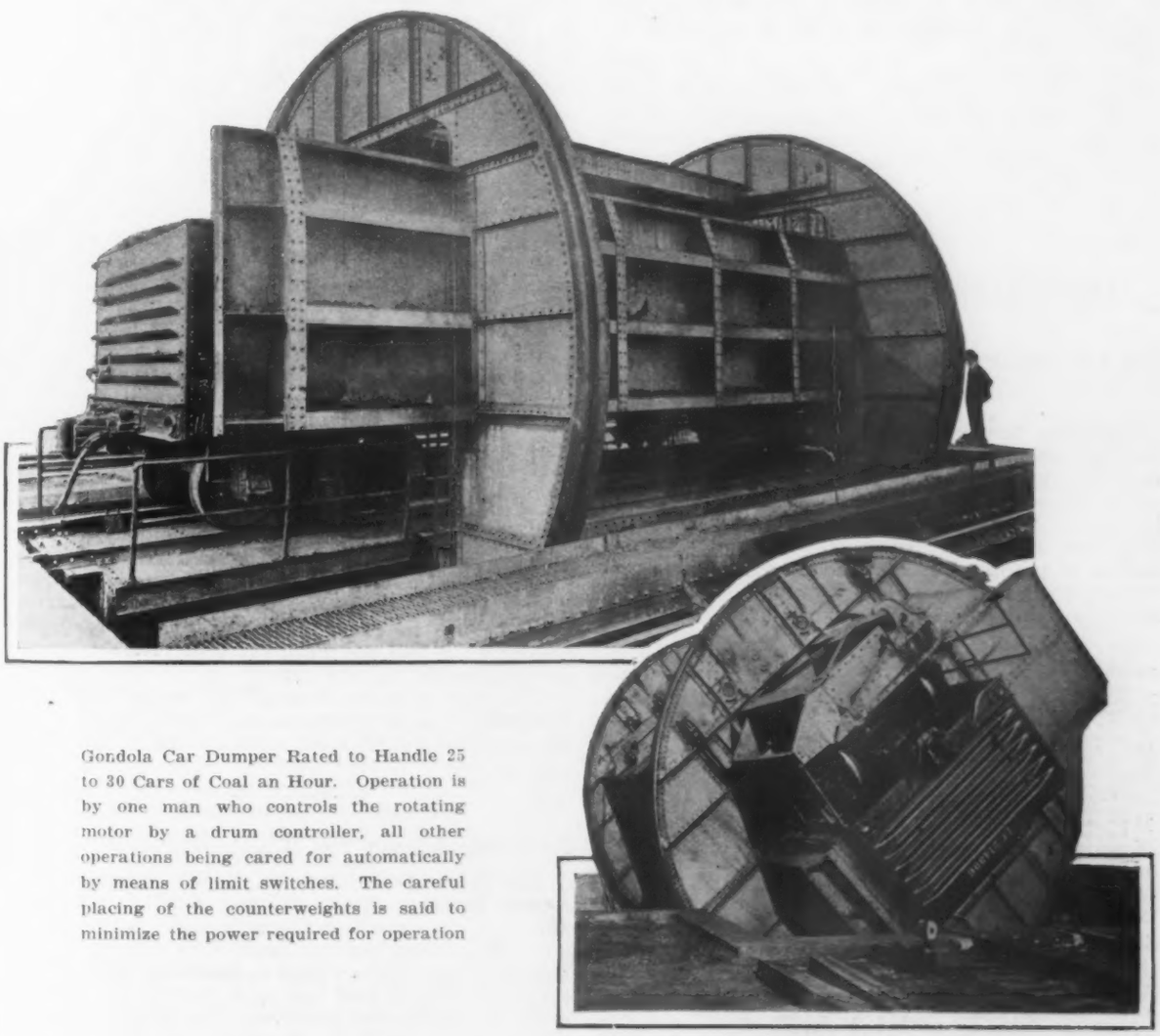
Month Year:	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
January	$8.94	$8.44	$14.81	$22.50	$33.50	$21.88	$24.50	$14.63	$11.40	$22.30
February	9.69	8.63	14.56	22.50	32.94	17.25	26.50	14.38	11.06	23.69
March	9.10	8.65	15.35	23.75	31.25	17.50	24.70	12.10	12.61	25.63
April	9.06	8.06	15.50	27.38	30.36	17.15	23.50	11.13	14.00	24.94
May	9.06	8.13	15.35	30.10	30.36	15.50	22.75	12.20	14.90	22.70
June	9.00	8.55	14.63	39.13	30.36	16.25	22.50	11.75	14.19	20.13
July	9.00	9.56	13.50	41.00	30.36	18.30	24.25	10.38	16.00	18.75
August	9.00	10.56	13.90	39.50	30.36	21.00	25.90	10.90	17.15	18.63
September	8.95	11.00	14.75	36.50	30.36	19.60	24.75	11.63	19.50	19.25
October	8.50	11.25	15.50	29.80	30.36	19.13	21.88	13.25	20.50	16.90
November	8.06	12.95	22.50	29.50	30.36	20.88	18.60	12.75	19.50	15.75
December	8.15	14.88	23.25	31.85	29.06	22.20	15.13	11.25	19.75	17.75
Annual averages....	$8.87	$10.07	$16.07	$28.90	$30.78	$18.92	$22.91	$12.18	$15.89	$20.70

CARS DUMPED IN 70 SECONDS

One-Man Control and Automatic Operation Features of Rotary Machine—Operation Outlined

Dumping a 50-ton car of coal in 1 min. and 10 sec., with only one man, who controls the 35-hp. motor that drives the mechanism, is the performance claimed for the gondola car dumper illustrated, which was recently installed at the new plant of an electric light and power company at East St. Louis.

With only the first unit of the new plant completed, the coal consumption at present averages but eight cars a day, under which burden the continued operation of the dumper seldom exceeds 20 min. The completion of additional units will, of course, place a greater burden upon the dumper, but even with the present minimum load the contractors feel the dumper pays for itself in the time and labor saved. The bottom dump method usually requires the labor of two men for 30 min. to unload one car of coal, whereas with the dumper illustrated it is claimed that cars of coal may be handled at the rate of 25 to 30 an hour.



Gondola Car Dumper Rated to Handle 25 to 30 Cars of Coal an Hour. Operation is by one man who controls the rotating motor by a drum controller, all other operations being cared for automatically by means of limit switches. The careful placing of the counterweights is said to minimize the power required for operation

In common with any rotary type of car dumper, the mechanism has three distinct functions to perform. These are rotation of the car through an angle which will permit the discharge of the material, support of the car on its tipping side, and the clamping of the car at the top. In spite of this multiple and seemingly complicated action, the operator, in this case, has but one controller handle to operate. This controller is of the drum type, similar in design to a street car controller, and although it provides speed control, its primary function is the starting of the rotating motor. All other operations are cared for automatically by limit switches.

The car dumper is made up of two separate structures. One comprises the two roller rings, 24 ft. in diameter, and the other the transfer table or platen upon which the car stands. The transfer table is carried on four rollers, two in the plane of each roller ring. The track for the rollers consists of four wedge-shaped or beveled castings, attached to the under side of the transfer table.

The bevel of these castings is such that the transfer table, with the car, would move over to the side support if it were not restrained. It is held in place, however, by two hook-shaped castings fastened to the ends of the transfer table. Each of these castings engages a roller which is an integral part of the foundation. As the dumper starts to rotate the hook-shaped castings remain in contact with the rollers, serving as a retarding device for the transfer table, there being a relative movement between the transfer table and the rest of the dumper, until the car has reached its side support. The angle of the beveled plates, which causes the platen to move toward the dumping side simultaneously with the rotating movement, is approximately 6 deg., and the distance of car travel from 6 to 12 in., depending upon the width of car.

With the return movement these operations are reversed. The car remains supported by the side structure until the hook-shaped castings engage the rollers. After engagement the continued rotation of the dumper causes pressure to be exerted between the rollers and hook castings which is sufficient to push the transfer table up the slight incline made by the slope of the beveled supports and to aline the rails correctly.

With the car in the normal position on the dumper

the controller handle is in the neutral position. To begin the cycle of operations the controller handle is moved into the extreme forward position, whereupon the rotation of the dumper and movement of the transfer table starts immediately. Upon rotating 10 deg., a projection on the side of one of the roller rings operates a track limit switch, which in turn starts the top clamp motor. This motor, which is of 10-hp. capacity, pulls the four top clamps downward simultaneously, until all of them have become firmly seated upon the top of the car and have exerted a predetermined pull on the operating cables. When this pull has been reached it displaces an idler, which displacement operates a load switch, thereby cutting off the motor and setting a high torque brake.

With the car firmly held to its dumping side and clamped at the top, the dumper continues to rotate until the rotating motor is stopped automatically by limit switches, which are placed to operate at the end of the rotating movement.

The operator now moves the controller handle through the neutral position and into the extreme reverse position, which reverses the direction of the rotating motor, the dumper returning to its normal position. On the return movement, when the dumper is within about 10 deg. of its initial position, the top clamp motor limit switch is tripped, which reverses automatically the direction of this motor and counterweights raise the top clamps to their initial position. When the top clamps have reached their uppermost position the clamping motor is cut out by a limit switch operated by one of the clamps. The rotating motor is also stopped on its return movement by a limit switch and the rails are held in correct alinement by a solenoid brake.

It may be noted that simplicity of operation is an outstanding feature. The supporting of the car at the dumping side and the clamping at its top are both automatic and their operation depends solely upon the rotation of the dumper.

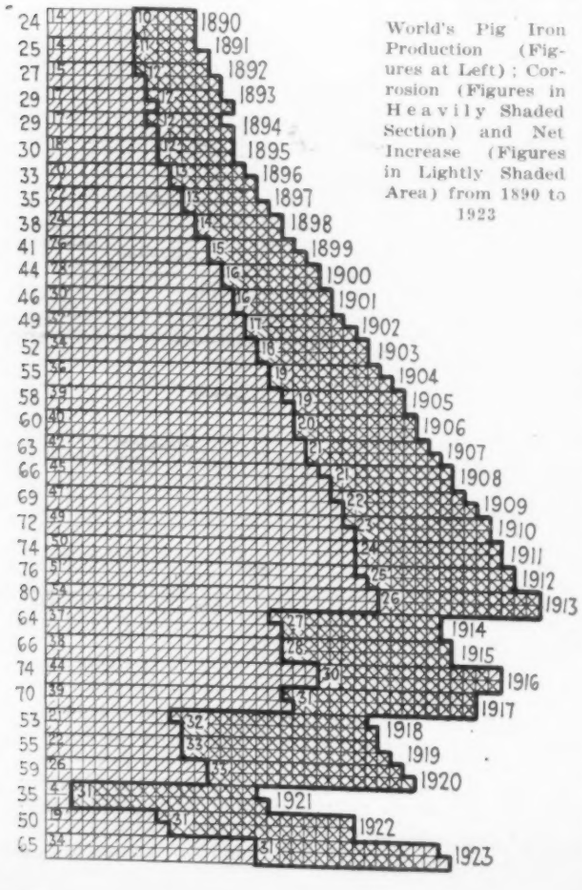
A feature also is the placing of the counterweights, extreme care having been used in determining the amount and correct location for these members, resulting, it is said, in minimizing the power requirements. Although the rotating motor is of 35-hp. capacity, the structure of the dumper is said to be so well balanced that ammeter readings indicate that the capacity is in excess of the actual power required.

The gondola car dumper described was built and erected by the Link-Belt Co., Chicago.

IRON LOSSES BY CORROSION

Total of 718,000,000 Tons in 34 Years, or 21,000,000 Tons Per Year

Startling figures have been given to the amount of iron lost annually through corrosive agencies. In the diagram appended, which is taken from the *Journal* of the West Scotland Iron and Steel Institute, the estimated loss from this source is plotted year by year, from 1890 to 1922 inclusive, against the world's production of pig iron. Each square in the diagram represents 1,000,000 gross tons. The figures at the left show the total pig iron production of the world for the year. The figures immediately inside the diagram represent the net gain in the world's iron, resulting from the pig iron production less the iron loss through corrosion, while the figures in the double hatched area at the right are those for corrosion as estimated.



World's Pig Iron Production (Figures at Left); Corrosion (Figures in Heavily Shaded Section) and Net Increase (Figures in Lightly Shaded Area) from 1890 to 1923

From the diagram, the largest pig iron production ever reached was that of 1913, with 80,000,000 tons. Nearly one-third of this, or 26,000,000 tons, is given as the corrosion loss, leaving 54,000,000 tons as the net gain for that year, this being the highest for any year. The lowest for any year in the range covered was in 1921, when world business conditions were so poor that only 35,000,000 tons of pig iron was made, with a corrosion loss of 31,000,000 tons and a net gain of only 4,000,000 tons. We have added to the diagram the estimated figures for 1923, using the same corrosion element as in 1921 and 1922, and using 65,000,000 tons as the probable pig iron output.

For the 34 years covered, the production totals 1,766,000,000 tons; the corrosion, 718,000,000 tons; the net gain 1,048,000,000 tons, or an average of 31,000,000 tons per year.

New Ore Agency for Rogers-Brown Iron Co.

The Rogers-Brown Iron Co., Buffalo, has appointed Agnew, Batteiger & Co., Widener Building, Philadelphia, its exclusive selling agents for Lake Superior iron ore. The account has been handled for many years by Rogers, Brown & Co. Agnew, Batteiger & Co. were organized about a year ago by J. Carson Agnew, formerly assistant to the president of the Midvale Steel & Ordnance Co., and R. L. Batteiger, who was Mr. Agnew's assistant in charge of the raw materials division of the Midvale company. When the Bethlehem Steel Corporation purchased the Midvale Steel & Ordnance Co., Mr. Agnew and Mr. Batteiger engaged in business for themselves, selling pig iron, coke and scrap. They have opened an office in Pittsburgh for the handling of ore sales in the Mahoning and Shenango valleys. The ore properties of the Rogers-Brown Iron Co. consist of the Susquehanna mine at Hibbing, Minn., and the mines of the Munro Iron Mining Co. in northern Michigan.

Members of the executive committee of the National Association of Farm Equipment Manufacturers who met at Chicago recently strongly indorsed the Mellon plan for tax revision and at the same time registered opposition to any tinkering with the transportation act, declaring that this act should be given a fair trial under conditions more nearly normal than have yet prevailed.

JAPAN MAY BUY IN SPRING

Politics, Arrival of Purchases and Near End of Tariff Suspension Cause Delay—China Quiet

NEW YORK, Jan. 21.—Trade with Japan is almost at a standstill, attributable to a number of factors. The decline of the yen to one of the lowest points ever reached, lower even than the depreciation at the time of the depression in 1921, has caused the Government to adopt drastic measures to curtail foreign buying. Importers and merchants in Japan report that it is exceedingly difficult at present to establish letters of credit with banks, as a rule $500 being about the limit imposed. Another factor, which is believed to be indirectly affecting trade is the uncertain political situation which has followed the resignation of Viscount Goto and his cabinet. The present ministry is not expected to endure long. Shipments of material are now arriving in Japan on orders placed soon after the earthquake and purchases made now would, as a rule, not be delivered at a Japanese port until after the expiration of the act suspending duties on iron and steel products, which is not expected to be renewed.

In addition to these conditions, the Metropolitan Reconstruction Board will probably cease to function by the end of February or early in March, and the work of reconstruction will be taken over by the Bureau of Home Affairs, which holds the recent appropriation for this purpose. It is rumored among exporters and importers in Japan that Government buying direct is ended and that future purchases will be made through the usual channels of recognized Japanese export and import companies. In the meantime, the Japanese mission to the United States, headed by the vice-president of the Yokohama Specie Bank, formerly New York manager of that bank, is expected to negotiate a loan, which will aid in returning the yen to par value, thereby improving the present conditions considerably.

At present, even the usual small buying has disappeared. The tender of the South Manchuria Railway Co., opened Dec. 27, which calls for about 300 tons of railroad spikes, has not yet been heard from. The only recent inquiry of any size, closed last week, was for 5000 boxes of tin plate from an oil company. It is believed that the Asahi Oil Co., said to be in financial difficulties, will be taken over by the Nippon Oil Co. in the near future. This will leave one fair sized, independent oil company in Japan.

The Chinese market continues quiet, except for sporadic interest in wire shorts, tin plate wasters and similar material. With the domestic scrap market rising, prices on second-hand material are too high to interest Chinese buyers. The inquiry of the Chinese Eastern Railway for about 150,000 ft. of pipe, 4000 kegs of nails and a sizable tonnage of bolts, nuts and spikes has not yet been closed. As the Chinese Eastern is a profit-making enterprise and understood to be financially stable, the usual credit difficulties in Chinese business probably will not develop in this instance.

AUSTRIA SLOWLY RECOVERING

Production Increased in 1923 as Result of Ruhr Occupation—Electric Projects Planned

VIENNA, AUSTRIA, Jan. 5.—Negotiations are in progress among Austrian iron and steel interests for an association to allocate orders and fix prices. The latest tendency in Austrian prices is upward. The official index, which is based on 100 in September, 1922, and which fell to a lowest point of 83.8 three months later, was 101.5 in December, 1923. The biggest Austrian interest, the Stinnes-controlled Alpine Montan Gesellschaft, was lately reported to be negotiating for a price agreement with the Czecho-Slovak steel corporations, which have their own association. In Jugoslavia and Bulgaria keen competition between Austria and Czecho-Slovakia has lately been the rule.

In general, Austrian conditions are improving with better State finances and the stabilized currency. The number of publicly supported unemployed in all industries fell from 161,227 in January, 1923 to 80,131 in September, and to an estimated 75,000 in December. The number of unemployed among iron, steel and metal workers at the beginning of October was 12,733.

Toward the end of 1923 the Austrian iron, steel and machinery branches were reported operating at a high percentage of capacity. The demand caused by the Ruhr occupation had not altogether ceased and numerous reconstruction orders were received from Japan. Austria is best able to compete in countries which can be supplied via Trieste and this applies to both Japan and China.

The enormous rise in German prices at the beginning of last December also helped Austrian exporters, but following the latest reduction in German coal prices Austria will probably find it difficult to compete.

Austria's machinery industry now employs 19,789 workers. From September, 1922, to early in 1923 most machine shops operated only from three to five days per week, but after June there was a marked improvement.

Water Power to Save Coal

The electrical industry expects a prosperous period as a result of numerous power plants now being built or planned. In 1922, 400 projects for electric power and light stations were officially sanctioned and in 1923 about 350 projects. Most of these were small plants. Since January, 1923, power stations with a total of 339,000 hp. have been started. Of the potential 4,024,000 hp. estimated in Austrian streams totaling 6650 miles, 2,003,000 hp. is considered possible of profitable development. Of this total, prior to 1920 only 325,000 hp. was used. Austria's annual fuel consumption is more than 16,230,000 metric tons. Of this, 7,900,000 tons, it has been officially estimated, can be spared by electrification.

Iron and Steel Production

In the first nine months of 1923, Austria's pig iron production increased considerably. This was a result of the Ruhr crisis and of conditions generally favorable to Austrian business. Per capita production also increased, although with a 9-hr. day it was far below the output of the 10 to 12-hr. day in effect before the war. In the first quarter of 1923 production of pig iron was 73,691 tons, second quarter 93,387 tons, third quarter 100,300 tons, at which rate the 1923 production would be 334,222 tons.

Steel ingot production increased considerably in the second quarter of 1923, being 133,360 tons against 90,317 tons in the first quarter. In the third quarter, steel production was 141,000 tons.

In the second quarter as compared with the first, the production of steel rails trebled, while sheet production doubled. Making allowance for Austria's inevitably minor place in the world's steel industry, as a result of small population and limited coal and ore resources, present conditions are satisfactory. In 1920 the estimated pig iron production was only 100,000 tons, or not much more than a quarter of the 1923 figure, while steel production was only 198,500 tons.

Of iron, steel and other metals, Austria (on a basis of data for the first three quarters of 1923) exports more than she imports of machines, electrical goods and automobiles.

The discovery of manganese fields at St. Johann in Pongau is reported. The Alpine Montan-Gesellschaft has blown in a third blast furnace. This company is rapidly increasing its production of Stylian lignite. It lately raised its prices for bars by 100 paper crowns per kg. The price of pig iron (per metric ton) declined from 2,517,750 paper crowns in the first quarter of 1923 to 1,900,000 crowns in the third; bars 5,202,350 to 3,075,000 crowns; heavy sheets, 3,828,300 to 3,600,000 crowns. Wages continued practically unchanged, but were less than in 1922.

Program for the February Meeting of the Mining Engineers

A program of 12 technical papers has been arranged for the sessions on iron and steel at the 129th meeting of the American Institute of Mining and Metallurgical Engineers, to be held in New York, Feb. 18 to 21. The first steel session is scheduled for the afternoon of Monday, Feb. 18, and the second for the afternoon of Tuesday, Feb. 19. The programs for these two meetings are as follows:

Monday, 2 p. m.

"Overstrain in Metals," by Joseph Kaye Wood, engineer, New York.

"The Nature of Martensite," by Dr. Edgar C. Bain, research metallurgist Atlas Steel Corporation, Dunkirk, N. Y.

"Effect of Zirconium on Hot-Rolling Properties of High Sulphur Steels and Occurrence of Zirconium Sulphide," by Alexander L. Feild, research metallurgist Electro Metallurgical Co., New York.

"Micrographic Detection of Carbides in Ferrous Alloys," by Norman B. Pilling, metallurgist Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

"Use of Sodium Picrate in Revealing Dendritic Segregation in Iron Alloys," by V. N. Krivobok and Dr. Albert N. Sauveur, professor of metallurgy and metallography, Harvard University, Cambridge, Mass.

"Pits and Pyramids," by H. S. George, metallurgist Union Carbide & Carbon Research Laboratories, Long Island City, N. Y.

Tuesday, 2 p. m.

"Absorption of Sulphur from Producer Gas," by J. H. Nead, chief metallurgist American Rolling Mill Co., Middletown, Ohio.

"Economic Significance of Metalloids in Basic Pig Iron in Basic Open-Hearth Practice," by C. L. Kinney, Jr., superintendent of open-hearth No. 1, Illinois Steel Co., South Chicago, Ill.

"Effect on Steel of Variation in Rate of Cooling in Ingot Mold," by William J. Priestley, metallurgical engineer Electro Metallurgical Sales Corpn., Pittsburgh, Pa.

"Stainless Steel with Particular Reference to the Milder Varieties," by J. H. G. Monypenny, chief of research laboratory, Brown Bayleys Steel Works, Ltd., Sheffield, England.

"Effect of Coke Combustibility on Stock Descent in the Blast Furnace," by P. H. Royster, assistant metallurgist Bureau of Mines, Minneapolis, Minn., and T. L. Joseph, associated metallurgist.

"The Story of Fireclay Refractories," Moving Pictures.

"Requirements of Refractories for the Open-Hearth," by F. W. Davis, and G. A. Boyle.

The annual Dr. Henry M. Howe memorial lecture is to be delivered this year at 4 p. m. Tuesday, Feb. 19, by Dr. Albert Sauveur, professor of metallurgy and metallography Harvard University, Cambridge, Mass., on "Steel Today and Yesterday."

The annual lecture of the Institute of Metals Division of the Society will be delivered at 4 p. m. Monday, Feb. 18, by Dr. Zay Jeffries, director of research Aluminum Castings Co., Cleveland, Ohio, who will speak on the "Trend in the Science of Metals."

There will be the usual technical sessions of the Institute of Metals Division, the first one being scheduled for 2 p. m. Tuesday, Feb. 19, when several papers on brass and copper will be read and discussed. The second session will be held on the afternoon of Wednesday, Feb. 20, which will consist of a round table discussion on fluxes and deoxidizers with George K. Elliot, chief metallurgist Lunkenheimer Co., Cincinnati, Ohio, as chairman.

There are two sessions devoted to the subject of metallurgy, one on the afternoon of Monday, Feb. 18, and the other on the afternoon of Tuesday, Feb. 19, devoted largely to problems involving the smelting of copper, zinc and lead ores.

"Oxygenated Air" is the subject of a session Wednesday afternoon, Feb. 20, with Prof. Bradley Stoughton, head of the department of metallurgy, Lehigh University, Bethlehem, Pa., in the chair. The subject of "The Use of Oxygen or Oxygenated Air in Metallurgical and Allied Processes" will be introduced by F. W. Davis, metallurgist Bureau of Mines, Washington, followed by discussions conducted under various subdivisions of this subject as applied to the blast furnace, ferroalloys, non-ferrous metallurgy, bessemerizing and other departments of industry.

The annual banquet will be held at the Waldorf-Astoria on the evening of Feb. 20, and the annual excursion will take place on Thursday, Feb. 21, when a visit will be made by invitation of the Bethlehem Steel Corporation to its plant at Bethlehem, Pa.

Progress Made in Scientific Management to Be Discussed

A program designed to put on record the high lights of the development and application of scientific management during the past decade will be presented at the meeting of the Taylor Society, to be held at the Engineering Societies Building, New York, Jan. 24 to 26. The functional aspects which will be emphasized are those of the general manager, the sales and personnel departments. There will be seven sessions at five of which the presiding officer selected is the president, past president or chairman of a section of a society devoted to management subjects.

A critical analysis of scientific management, its accomplishments, shortcomings and future obligations, will be presented in a paper by Henry H. Farquhar, Harvard Graduate School of Business Administration, at a session at which Prof. Joseph W. Roe, past president of the Society of Industrial Engineers, will preside. Robert T. Kent, consulting engineer, New York, will be among those to discuss the paper.

H. P. Kendall, Boston, will present a paper on "Types of Management: Unsystematized, Systematized and Scientific." A paper presented by Mr. Kendall in 1911 under the same title is regarded by some as a classic; the new paper will present the observations and conclusions of 12 years after. The influence and scientific management principles on the practice of general management will be discussed at another session by John H. Williams, New York, in a paper on "Scientific Management and General Administrative Control."

In "Scientific Management in Selling and Advertising" Stuart Cowan, J. Walter Thompson Co., Cleveland, will present examples of the application of scientific management principles and methods to marketing problems. Facts indicating the progress made and results obtained will be given. W. A. McDermid, past president American Society of Sales Executives, will preside.

At a session with Sam A. Lewisohn, president American Management Association, presiding, Mary Gilson, Joseph & Feiss Co., Cleveland, will emphasize the principles under which personnel management has been developed in a scientific management plant during the past decade. J. H. Willets, Wharton School, University of Pennsylvania; R. B. Wolf, New York; Mary Van Kleek, Russell Sage Foundation, and George Soule, Labor Bureau, Inc., New York, will discuss the paper. The closing session will include a paper by Frank B. and Lillian M. Gilbreth, Montclair, N. J., on "Scientific Management in Other Countries Than the United States," and a paper by Morris L. Cooke, Philadelphia, under the title of "Scientific Management in Federal, State and Municipal Business."

At the business meeting to be held Jan. 24 officers elected by letter-ballot will be announced. A buffet luncheon has been arranged for Jan. 25.

Endows New Gold Medal of Mechanical Engineers

George I. Rockwood, president and treasurer of the Rockwood Sprinkler Co., Worcester, Mass., has endowed a gold medal of the American Society of Mechanical Engineers, to be awarded "in those rare cases when an individual has succeeded by the exercise of his genius and character in powerfully assisting the fortunes of our country or the general engineering progress of the world." Mr. Rockwood was the guest of honor at a dinner meeting of the Worcester section of the society on Jan. 14.

WILL DETERMINE RIGHTS

Trade Association Will Obtain Decision in Regard to Distributing Information

WASHINGTON, Jan. 22.—The Cement Manufacturers' Protective Association through Attorney John W. Davis in New York is preparing to appeal directly to the United States Supreme Court from the recent decree of Judge Knox in New York against the association because af alleged violation of the Sherman anti-trust law. The plan to appeal the decision to the Supreme Court without first going to an intermediate court has been agreed to by the Department of Justice, and the purpose is to obtain as quickly as possible a test of the legal rights of trade associations to compile and distribute among their members information dealing with statistics such as production, consumption, stocks and prices on closed transactions.

The recent correspondence between Attorney-General Daugherty and Secretary of Commerce Hoover on this subject has stimulated interest in it. The view generally is held that the Attorney-General's informal advice, which he said was based on Supreme Court decisions, as well as the consent decree in the tile case, restricts the activities of trade associations to distribution of the most ordinary trade information through a Government department exclusively. Assuming that this is the proper interpretation of the law, it is realized that trade associations would have no incentive for existence and that not only would they discontinue cooperating with Government departments but that many of them would disband. At the same time it is evident that counsel for trade associations are firmly convinced that the inhibitions set forth in the Tile and Cement cases and approved by the Department of Justice are altogether too restrictive, and because of this it is desired to get an early test in the Supreme Court in the Cement case, which is held not to be analogous to the Hardwood and Linseed Oil cases, which were decided by the Supreme Court adversely to the trade associations affected.

Secretary of Commerce Hoover also has requested the advice of Solicitor Davis of the Department of Commerce as to the interpretation of the latest Daugherty letter as it relates to the right of trade associations.

SECRETARY HOOVER'S POSITION

Future Action as to Cooperation with Trade Associations Undecided

WASHINGTON, Jan. 15.—Secretary Hoover is awaiting the return to Washington this week of Solicitor S. B. Davis of the Department of Commerce before making known the position of the Department in receiving further cooperation from trade associations. The Solicitor will be asked to analyze the latest statement of Attorney-General Daugherty to the Secretary outlining the position of the Department of Justice as to the legality of trade association activities.

After the statement is interpreted by the Solicitor, it is expected that Secretary Hoover will announce whether or not the Department of Commerce will continue to receive statistics from trade associations. It was made known that a number of trade associations have communicated with Secretary Hoover since the Daugherty statement was issued, but the tenor of their communications was not disclosed.

The belief has grown that whatever the restrictions as laid down by the Attorney-General on trade association work, the question of legality still remains undetermined even in face of several Supreme Court decisions, and that it should be cleared up by a test case because a consent decree is insufficient.

Braeburn Alloy Steel Corporation Acquires the Braeburn Steel Co.

Properties of the Braeburn Steel Co., Braeburn, Pa., were acquired Jan. 15 from the Marlin-Rockwell Corporation, New York, by a new company known as the Braeburn Alloy Steel Corporation, incorporated for $1,000,000, of equal amounts of preferred and common stock. All the stock has been sold. The plant is being put in shape for immediate operation.

D. T. Sipe, formerly president Vanadium Alloys Steel Co., Latrobe, Pa., is president of the new company; G. H. Neilson, formerly president Braeburn Steel Co., is vice-president and general manager; G. W. Yealy, president First Savings & Trust Co., Dairy, Pa., is treasurer, and A. J. Barnett, president Barnett Coal Co., Latrobe, is secretary. F. N. Graff, president First National Bank, Blairsville, Pa.; F. Malcolm Graff, of Graff Brothers, coal operators, Blairsville; F. E. Pratt, vice-president First National Bank, New Kensington, Pa., and S. M. Volkel, of the J. H. Holmes & Co., bankers, Pittsburgh, are directors.

This company's plant has an annual capacity of 12,000 tons of electric steel and 4000 tons of crucible steel ingots. Its equipment consists of two crucible furnaces, one 24-pot and one 26-pot; two 6-ton electric furnaces, one 10-in. 3-high, 5-stand bar mill and one 14-in. 3-high 5-stand bar mill, one 500-ton hydraulic press, 6 steam forging hammers and the usual equipment of heating and annealing furnaces. In addition, it has a fully equipped wire mill and complete physical and metallurgical laboratories. The plant is on the Allegheny division of the Pennsylvania Railroad.

Judge Gary to Preside at Engineers' Dinner

Judge Elbert H. Gary will preside at a joint dinner of the New York sections of the American Society of Mechanical Engineers, the Army Ordnance Association, the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Institute of Electrical Engineers, and the Society of Automotive Engineers, which will be held at the Hotel Commodore on Tuesday evening, Feb. 5.

The addresses will be on industrial preparedness as insurance against war. In addition to Judge Gary, Assistant Secretary of War Dwight F. Davis and Col. James A. Walsh will speak.

WILL MODERNIZE PLANT

Homestead Steel Works Will Be Reconstructed at a Cost of $20,000,000

PITTSBURGH, Jan. 22.—Work will soon be started in the modernization of the Homestead Works, Carnegie Steel Co. This step has been under consideration for several years, and an appropriation has just been granted covering the cost of the improvements, which, it is figured, will take a period of three or four years and involve expenditures of about $20,000,000.

No official statement was made as to the plans of the company, but it is understood that the first replacements will be of the structural mills, several of which are less modern than other rolling-mill equipment in this plant.

The Homestead Steel Works, which is located in Munhall, Pa., was built in 1880-1881 and has 65 open-hearth furnaces, 27 heat-treating furnaces, 57 heating furnaces, slabbing, cogging, blooming and structural mills, plate mills, bolt and rivet works, armor plate plant, gray-iron and steel foundry. The product and annual capacity of the works, as given by the Iron and Steel Works Directory, is as follows: 2,128,000 tons of ingots, 2500 tons of steel castings, 2500 tons of iron castings, 1,481,000 tons of blooms, billets and slabs, 448,000 tons of heavy structural shapes, 338,000 tons of universal plates, 891,000 tons of sheared plates, 24,000 tons of merchant bars, 22,500 tons of armor plate, protective deck plate and heavy forgings, 16,800 kegs of rivets and bolts.

Committee Reports on Financial Incentives for Employees

The extent to which various methods of wage payment are in use and the relationship between the wage system and foremanship, inspection, planning and accounting are outlined in a tentative report of the committee on remuneration for employees, just printed, of the American Management Association. The committee includes D. W. K. Peacock, personnel director White Motor Co., Cleveland, chairman; Elisha Lee, Pennsylvania Railroad, Pittsburgh; and A. H. Young, International Harvester Co., Chicago. Methods of applying incentives to wrokers on non-repetitive operations are suggested, and the advantages and disadvantages of typical wage plans broadly indicated.

A survey of factories employing over 250,000 workers is said to indicate that three-fourths of the plants, employing 110,000 workers, use straight piece work, and among the latter only one-fifth guarantee the day rate. One-third of the factories use some form of bonus based on a comparison of actual time with standard time. The "standard hour" is the most frequently reported of all forms of bonus.

In plants using piece rates and employing 110,000 workers, two-fifths of these workers are paid on piece rates, the remainder on a straight hourly basis. In plants using a bonus system and employing 19,000 workers, one-third of the men are paid on the bonus plan and two-thirds by straight time. It is emphasized that these averages should not be construed to mean that 40 per cent of the workers in any one plant are on piece work, because the ratio varies with the nature of the industry, a metal working plant, for instance, paying 68 per cent of its workers on piece rates.

A section of the report discusses the increase in production following installation of a wage incentive plan. Difficulty is indicated in attempts to discover what part of increased production is caused by the actual wage system; what part is the psychological result of the fact that the individual production is measured and recorded, and what part is produced by better planning, material control and related management. Several production engineers, it is said, have asserted that as much as 80 per cent of the final increase in production was reached before a single piece rate was set, solely through better management control. All agree that to install a wage incentive before the other agencies of control are properly functioning is to open Pandora's box. The increased clerical expense involved in installing a wage incentive is said to vary with the plan, but is always greater than for straight time payment.

Among organization changes needed for a wage incentive plan are the counting and inspection functions, the former being transferred from foreman to planning department and the latter to the engineering division. It is stated that usually a more functional form of organization accompanies the use of a wage incentive plan. On the opposite side of the balance is the reduced need for supervision to keep men from loafing. The foreman's job changes from taskmaster to instructor, which often means a change in personnel, for the type of foremen who succeeds in one does not usually succeed in the other.

In the discussion of the various types of wage incentives the straight piece rate as compared with other wage incentive plans is said to be in favor, its advantage being in its simplicity. Most of the faults charged to it are said to be faults in setting standard times, which would equally impair any other plan. Lack of flexibility is cited as a disadvantage of the piece work system, and the difficulty presented in the low hourly rate usually assigned to piece work jobs is discussed. Another objection made to the piece rate is that it does not permit paying a higher rate to one worker in recognition of superior skill, length of service or other desirable quality which does not express itself directly in output. The "standard hour" wage payment, a modification of the piece rate system to avoid difficulty arising when a general change in wage level is made, is briefly discussed.

A section of the report is devoted to wage incentives for foremen and inspectors and other "indirect" workers. Examples are given of typical bonus plans and a section of the group bonus includes a discussion as to where it will succeed, how it works, and the method of accounting for group bonus. An extensive biography on wage incentive for employees is appended to the report, and also an abstract of the discussion of the report at the convention of the association, held in New York, Oct. 29, 1923.

Stainless Steel, Its History and Properties

An attractive booklet of 61 pages has been issued by the Firth-Sterling Steel Co., McKeesport, Pa., entitled "Firth-Sterling Stainless Steel." It is well illustrated, showing various products made of both stainless steel and rustless iron. After a brief history of the discovery and development of stainless steel, there follow brief chapters on its applications and possibilities, on types of stainless steel and a particularly good discussion of its heat treatment and working. There are also brief sections devoted to chemical analysis and physical properties of this steel in which are given charts covering its strength at different temperatures and its scaling properties at high temperatures. There is also a section devoted to the resistance of stainless steel to various agencies of rust, stain and corrosion. The book, as a whole, is an interesting contribution to this important subject.

Mechanical Engineers' Spring Meeting

On account of conflicting convention dates in Cleveland in May, the date of the spring meeting of the American Society of Mechanical Engineers has been postponed for a week. It will be held in Cleveland May 26-29, inclusive. Frank A. Scott, president of the Cleveland Engineering Society, is chairman of the committee on local arrangements.

REVERSES COMMISSION

Attorney-General Renders Decision as to Flexible Provision of Tariff Law

WASHINGTON, Jan. 22.—Jurisdiction of the Tariff Commission under the flexible provisions has become further involved. This fact has just been disclosed with the announcement that Attorney-General Daugherty has reversed the commission on its first report to the President under the flexible provisions. In this specific instance, the Attorney-General held that the commission does have authority to raise or lower the rate of $1 per 1000 board ft. on imports of logs of cedar, fir, spruce, and Western hemlock. President Coolidge has sent the opinion of the Attorney-General to the commission, and is said to have directed it to "proceed in accordance therewith." The commission last August, in passing upon the application of lumber mills in the Pacific Northwest, which had asked for a reduction of 50 per cent on imported logs from British Columbia, held, by a vote of four to two, that this particular provision was for penalty purposes only, and that the commission itself had no jurisdiction. Instead, it was declared that application of this clause rests with the Treasury Department, inasmuch as the clause provides that the log duty shall not apply if the Nation, province, or political subdivision from which the commodity is imported has not imposed any restriction on its exportation within 12 months.

The majority opinion of the commission was written by Commissioner Glassie and signed by himself, together with Chairman Marvin and Commissioners Burgess and Lewis. The dissenting opinion was signed by Vice-Chairman Culbertson and Commissioner Costigan. The opinion was sent to the White House and the President in turn submitted it to the Attorney-General for a ruling. Although the text of the opinion of the Attorney-General has not been made public, it is said that Mr. Daugherty took the position that there was no valid reason why the commission did not have jurisdiction. Amplifying this point, it is said the Attorney-General declared that Congress would have specifically expressed limitations of the commission had it been intended that any should apply. The case is of general interest because it again raises the question as to the authority of the commission under the flexible provisions. The opinion of the Attorney-General in the log case plainly gives to the commission greater powers than did the majority of the commission itself, although it is consistent with the attitude taken by the Attorney-General previously, when he passed upon the flexible provisions of the tariff law. It is conceivable that the log case along with others which already have been instituted will be finally submitted to the Supreme Court as tests of the power of the commission under the flexible provisions.

Final Argument of Pittsburgh Base Case

WASHINGTON, Jan. 22.—The Federal Trade Commission yesterday set June 9 as the date for the final argument in the Pittsburgh base case. The date of beginning surrebuttal testimony on behalf of the United States Steel Corporation, previously fixed for Feb. 15, may be changed. The commission, however, has set March 10 as the date on which surrebuttal evidence must be completed. The brief of the commission is to be filed by May 10 and that of the Steel Corporation by May 25.

Receiver for Atlas Steel Corporation

BUFFALO, Jan. 22.—Federal Judge Hazel has named John Lord O'Brian, Louis J. Campbell and Harry E. Nichols receivers of the Atlas Steel Corporation of Dunkirk in equity conservation. The action was brought by the Youngstown Printing Co. and other creditors. The documents show the Atlas has total assets of over $8,600,000 and liabilities of somewhat less than $6,500,000. The corporation is solvent but unable to pay debts as they mature. The receivers are authorized to continue the business as a going concern.

Increased Production in the Mahoning Valley

YOUNGSTOWN, Jan. 22.—Steel ingot production is being maintained this week at 93 per cent in the Mahoning Valley, as compared with a recent high production rate of 80 per cent. Of the 66 open-hearth furnaces in the Valley, 59 are melting, while all four Bessemer departments are active in this district.

Steel ingot output of the Youngstown Sheet & Tube Co. is being maintained at 90 per cent and that of the Republic Iron & Steel Co. at 85 per cent. The Republic company is adding an 85-ton open-hearth furnace to its complement, for a total of 15.

No. 2 blast furnace in the group at Hubbard, Trumbull County, of the Sheet & Tube company, was scheduled for resumption this week. With this stack active, there will be 30 blast furnaces in operation, out of 45 in the district. The Sheet & Tube company is also preparing its No. 1 furnace at Hubbard for relighting, but the date of its resumption is still undecided.

Rolling mill operations have also substantially increased in this territory during the past few weeks, except in the plate departments. The Sheet & Tube company has its 84-in. plate mill active this week, and plans to start its 110-in. mill at an early date.

Of 120 sheet and jobbing mills in the Mahoning Valley, 92 were scheduled on Monday, comparing with 85 the previous week and 68 the week before.

Accumulating Coal at Youngstown Iron and Steel Plants

YOUNGSTOWN, Jan. 22.—No interruption is likely to occur in the operation of iron and steel plants this year in the event miners and operators fail to agree on terms before April 1, when the current contract expires. Valley interests have been quietly preparing for any contingency which may arise, and are accumulating sizable stocks of coal.

By April 1, the Carnegie Steel Co. expects to have at least a 60 days' supply of coal and coke on hand at its Youngstown works, the process of accumulation now going on.

Most of the independents in this territory, especially the larger integrated interests, own their own coal mines in the non-union fields of Pennsylvania. They do not believe their miners would join the ranks of the strikers this time.

The Trumbull Steel Co. is now building 47 coke ovens at Warren, making a total of 642 in the Mahoning Valley.

Machine Tools at Seattle Sold by United States Shipping Board

WASHINGTON, Jan. 22.—The Schnitzer & Wolf Mfg. Co., Portland, Ore., highest bidder, has purchased the machine tools, equipment, plant supplies and materials at the Skinner & Eddy Shipyard, Seattle, Wash., from the United States Shipping Board. The purchase price was $226,255.

Steel-Furniture Shipments

WASHINGTON, Jan. 22.—The Department of Commerce announces that December shipments of steel-furniture stock goods, based on reports received from 22 manufacturers, amounted to $1,455,836 as against $1,339,425 in November, and $1,376,152 in December, 1922. The total shipments for the year 1923 amounted to $16,834,029 as against $12,928,026 in 1922.

BY-PRODUCT COKE RECORD

Largest Output Last Year—Beehive Tonnage Increased Over 1922

A new record in the output of by-product coke was established in 1923, and the total production of all coke during the year has been exceeded but twice in the history of the country, according to the report just made by the United States Geological Survey. The 2,999,000 tons reported by producers for December brought the year's output of by-product coke up to 37,527,000 net tons. This was an increase of 6,693,000 tons over the 1920 output, hitherto the maximum.

The combined production of beehive and by-product coke was about 55,487,000 tons, an amount almost equal to that of 1917 and only 1.8 per cent less than the record set in the war year, 1918. Production from by-product ovens passed the production of beehive ovens in November, 1918, and since that date by-product coke has been continuously in the lead. In 1923, 67.6 per cent of the total was contributed by by-product ovens and 32.4 per cent by beehive ovens.

Table 1—Production of Beehive and By-Product Coke in the United States

	Net Tons Produced			Per Cent of Total Output		
Year	Beehive	By-Products	Total	Beehive	By-Product	Total
1913	33,584,830	12,714,700	46,299,530	72.5	27.5	100.0
1915	27,508,255	14,072,895	41,581,150	66.2	33.8	100.0
1917	33,167,548	22,439,280	55,606,828	59.6	40.4	100.0
1918	30,480,792	25,997,580	56,478,372	54.0	46.0	100.0
1919	19,042,936	25,137,621	44,180,557	43.1	56.9	100.0
1920	20,511,092	30,833,951	51,345,043	40.0	60.0	100.0
1921	5,538,042	19,749,580	25,287,622	21.9	78.1	100.0
1922	8,573,467	28,550,545	37,124,012	23.1	76.9	100.0
1923	17,960,000	37,527,000	55,487,000	32.4	67.6	100.0

"The recovery in coke production was associated with great activity in the iron industry, and with a shortage of household fuel," says the report. "The demand for domestic coke resulting from the anthracite strike of 1922 was felt even by the beehive operators, and in the first quarter of 1923 Connellsville foundry coke was quoted at $8.25 to $9 a ton. Another flurry in coke prices was caused by the brief suspension in September, 1923, on the expiration of the wage agreement. From $5.25, the low level touched in July, the price of Connellsville foundry rose to $6 in the first week of September. This last increase in price proved to be short-lived, however, and the year closed with prices at $4.75 for foundry and $4 for furnace coke f.o.b. ovens, Connellsville.

"The month of highest production was May, when the by-product ovens were turning out coke at the rate of 40,000,000 tons a year. In the last five months of 1923 a slowing up of industrial activity was manifest, and the output of coke correspondingly declined."

Titanium in Gray Cast Iron

A great deal of experimental research was done in the last 20 years before the war on the influence of titanium on cast iron. The results were little in accord and no time was found during the war period for the continuation of these researches. Ascribing the want of accord chiefly to the fact that the many alloys experimented with were too rich in titanium and therefore refractory, that the titanium was added too early, or, not immediately before casting and in the form of nitrogen compounds, and that the effects were often calculated on the titanium percentages in the charge, not on the resulting metal, E. Piwowarsky, of the Aachen Technical High School in *Stahl und Eisen*, Dec. 6, 1923, experimented with a pure Swedish cast iron (4.01 C., 0.13 Mn., 0.06 Si, 0.01 S and 0.02 P), alloyed with ferrosilicon so as to contain 1 per cent, 1.75 per cent, or 2.75 per cent of Si, and a pure ferrotitanium prepared by the thermit reaction in a Hellberger electric furnace, fusing the metals sometimes under a layer of charcoal. He found, says *Engineering*, London, that titanium acts on cast iron like silicon, but much more strongly, by favoring the segregation of graphite, so that 0.10 per cent of titanium even produces the maximum segregation. This influence of titanium masks other effects. As the titanium percentage taken up is increased the graphite grain becomes finer, and the compression and bending strength of the iron are increased (the latter by 50 per cent). More than 0.50 per cent of titanium will hardly alloy with the iron; with higher percentages titanium compounds (carbide and cyanide) appear as microscopic crystals, the carbide especially when air is excluded. The improving effect of titanium seems mainly to be due to its taking up sulphur, oxygen and nitrogen; the metal also is less liable to attack by acid.

Judge Gary Calls on President Coolidge

WASHINGTON, Jan. 22.—Visiting the White House today at the request of President Coolidge to report on progress made in eliminating the 12-hr. day in the iron and steel industry, Chairman Gary of the United States Steel Corporation reported to the Chief Executive that the 12-hr. day has been abolished almost entirely.

The President, replying to a statement of Judge Gary that the elimination of the long work day had increased production costs by 10 per cent, expressed the opinion that the added costs should be borne without complaint by steel consumers for the benefit of the employees. Judge Gary informed the President that manufacturers hoped that the increased costs could be wiped out through improved operations and labor efficiency, but that time would be required to do this.

Judge Gary, in commenting on business conditions, was optimistic and commended the policies of the Coolidge Administration.

Cost of Building

Building material prices, as reported by the Bureau of Labor Statistics, reached a peak of 300 (compared with 100 as the average for 1913) in April, 1920. There was a drop from that figure to a minimum of 155 in March, 1922, followed by a further rise running through the past two years, reaching 202 last May. The figure for December, 1923, was 178, compared with 151 for the general range of commodities in that month.

Wage rates in the building trades are worked out only once a year, in May. There was a steady but slow rise until after the war was over. After that there was a jump from 145 in 1919 to 197 in 1920, and 200 in 1921. A recession to 187 was recorded in 1922, but last May the figure reached 207, or far higher than any figure during the war or since then.

Building trades' wages during the past year have been double the 1913 rate, where the cost of living has been up about 65 per cent. Since 1920 wages have held consistently above both material prices and the cost of living. This has permitted building mechanics to make up for the adverse conditions of the early years of the war. It has, however, contributed heavily to the general cost of living by increasing the price of housing.

Youngstown Sheet & Tube Co. Contracts for Coke

YOUNGSTOWN, Jan. 22.—Coke for its Hubbard blast furnaces, which are about to resume, will be secured by the Youngstown Sheet & Tube Co. from the Connellsville district, where the company has contracted for 30,000 tons of beehive coke, at a reported price of $4.25. Under normal conditions, the Sheet & Tube company is able to produce all of the coke requirements for its blast furnaces at East Youngstown and Hubbard from its by-product coke ovens at East Youngstown. However, the company contracted some time ago to supply the merchant stack at Struthers of the Struthers Furnace Co. with its coke needs until April 1, thus diverting a part of its output. Its "D" blast furnace at East Youngstown has likewise been enlarged, thus requiring large coke supplies. This furnace is now producing as high as 688 tons of iron per day.

CONTENTS

January 24, 1924

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building Detroit: 7338 Woodward Ave. Cincinnati: First National Bank Bldg. Buffalo: 833 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Looking for a Coal Strike

THE Geological Survey reports production of bituminous coal in the week ended Jan. 12 at 11,921,000 net tons, which is the highest output for any week since 1920. The next best week in the past twelve-month was the week ended Sept. 1, 1923, with 11,737,000 tons. At that time the lake demand was in full force and there was a special demand on account of the threat of a prolonged suspension at the anthracite mines.

The heavy production just reported cannot be ascribed to its representing a making up of the loss in output occasioned by Christmas. It is true that the production in the three weeks ended Jan. 12, the period including Christmas week, was only 27,702,000 tons, while production in the three preceding weeks had been 30,308,000 tons. The difference of 2,606,000 tons was probably more than balanced by decreased industrial and railroad consumption.

Calendar year production of bituminous coal has been as follows:

1918.....	579,386,000 tons
1919.....	465,860,000 tons
1920.....	568,667,000 tons
1921.....	415,922,000 tons
1922.....	422,268,000 tons
1923.....	545,300,000 tons

Production is running now at the rate of 610,000,000 tons a year, yet most producing districts have been reporting losses in production from "no market" ranging from 35 to 55 or 60 per cent.

The majority of observers are convinced that there is a fair volume of stocking of coal week by week by consumers. Even at the beginning of last September there were large stocks, estimated by the Geological Survey at 56,000,000 tons, against the record high of 63,000,000 tons on Armistice Day and at the beginning of the 1922 strike. In addition to the accumulation from that time to the present there is the heavier stocking that may be expected in February and March, for consumers prefer to defer some of their stocking to save interest on investment and to limit as far as possible, on account of deterioration and danger of fire, the time for which coal must be carried in stock. The prospect is that the stock April 1 will be by far the largest ever accumulated.

There is no expectation that an agreement will be reached at the Jacksonville meeting on Feb. 11 between the union bituminous operators and the United Mine Workers, and it is considered extremely improbable that any agreement will be reached by April 1. A suspension may be expected, if for no other reason than to allow the stocks to be reduced. The United Mine Workers will demand an advance, but probably only for strategic reasons. While some observers think a reduction will be made in the eventual settlement, these observers are hardly in the majority at the present time. No well marked step, therefore, is in sight toward solution of this trying and ridiculous coal situation. The United Mine Workers have had a quarter century of the check-off in which to eliminate non-unionism and have lost ground instead. Since 1922 some union mines have become non-union. Probably there will be more of that this year. This is the only definite trend toward relief for the public.

Factors in Increased Steel Output

AN observer of the course of the American steel industry in 1923 cannot but be impressed with the ease with which the almost record output of 43¼ million tons of steel was made. In 1917, under war-time pressure, over 43,600,000 tons of ingots was made, but with an expenditure of energy in the overcoming of difficulties that was unparalleled in the history of the industry. Last year almost an equal tonnage was made, but under conditions in decided contrast to the war effort. There was very little straining of equipment or shattering of nerves, for the heavy flow of steel went on more as a matter of course.

Increase in physical capacity by the building of new furnaces does not explain the 1923 achievement. Other factors making for increased output are becoming each year more effective. Faster working furnaces of the blow-torch type have grown in favor in recent years, resulting in greater production from the same equipment. A marked increase in the amount of scrap charged has resulted in decreased time per charge. Also the use of lime instead of limestone in some large basic open-hearth furnaces has given quicker production, with less fuel needed. Besides these factors there have been developed minor improvements in equipment, methods of handling the

charge and the heat—all working for increased efficiency.

More and more will be heard of improvements in equipment and processes. The trend since the war has been decidedy in that direction. And it is well that it is so, for the higher labor costs steel manufacturers must now reckon with are a problem of the first magnitude.

Steadiness of Steel Prices

OF late there has been much making of charts for the purpose of predicting the future of business. It may have escaped the attention of the average observer that one important commodity, steel, is conspicuously absent from the price charts. Perhaps the chartists considered steel, but if so there is a plain reason why they should be strongly disposed to keep steel prices out of their presentations. The reason is that there is no rule or rhythm to be worked out of the historic price fluctuations.

Finished steel prices have remained practically unchanged for nine months, and the preceding rise occupied 13 months, making a total of 22 months thus far. A summary of previous movements in steel brings out strongly the point just mentioned, that there is nothing like a standard or typical period in steel price movements. The 22-month period accumulated to date may be considered long or short, according to the historic cases cited for comparison. The time considered is from the beginning of a general rise to the beginning of a general fall.

In the "soda water rise" of 1895 the period was six months. Steel prices began to rise in March and began to break in September. In October, 1904, prices began to rise and in June, 1908, certain rather small declines occurred, making a 44-month period, but the general break did not occur until the following February, which would add eight months more.

Very precise comparisons cannot be made, for advances and breaks have been different, but adding some judgment to the mere scrutiny of price records, the following summary may be made of the length of time from the first definite advance in steel prices to the first definite beginning of declines, covering all the marked price movements in the history of the steel industry, since the time when soft steel supplanted wrought iron as the dominant material:

1895 : 8 months	1909-1910 : 10 months
1898-1900 : 16 months.	1912-1913 : 14 months
1900-1902 : 19 months	1914-1918 : 48 months
1904-1908 : 44 months	1919-1920 : 12 months

Obviously an average of these periods is not typical, but merely arithmetical. The arithmetical average is 21 months. Certainly when only two periods were longer than 21 months and six were shorter the average cannot mean anything. One might say that the 22 months that now have elapsed without decline, since the general advance began in March, 1922, is a longer period than "usual."

There is something else unusual about the recent course of steel prices. The decline that preceded the latest advance was unusually long and severe. It began in October, 1920, when prices of independent mills began to recede toward the Industrial Board schedule, which the Steel Corporation had held, and continued to March, 1922, making a period of 17 months. There have been other periods of equal or greater length, from the beginning of declines to the resumption of advances, but the circumstances were exceptional, and in some cases the declines were broken by slight rises.

There is no doubt that the length and severity of the last decline has had an important influence, first in restricting the advance of 1922 and the fore part of 1923 (for the advance was really quite moderate in the circumstances), and in deterring producers from tampering with prices in the past few months when orders were not equal to productive capacity.

Sulphuric Acid as a Business Index

SULPHURIC ACID has been mentioned as entering into so many widely ramifying branches of industry that frequently there has been a call for statistics concerning it, as giving an indication of business conditions and trends, possibly supplementing production figures for pig iron. An estimate of consumption of sulphuric acid in 1923 has just been made by *Chemical and Metallurgical Engineering*—an achievement of more than passing moment. However, the result does not justify any large dependence on sulphuric acid as a business index.

Nearly 45 per cent of the 60,000,000 tons made last year appears to have gone for fertilizers. Of the remainder, 18 per cent went for oil refining, 12 per cent was allocated to chemicals, celluloid, etc., and nearly 12 per cent was consumed in steel pickling and galvanizing. In short, two channels of consumption took 63 per cent and four took 87 per cent, the remaining 13 per cent being distributed among several other industrial uses.

One other sulphuric acid estimate, made for a war year, 1918, by the Bureau of Mines, naturally showed a large use for explosives, this amounting to 36 per cent. In that year explosives and fertilizers together took 64 per cent, fertilizers alone taking three and one-fourth times as much as did the oil industry, while in 1923 the ratio was 2.4 to 1.

Generalization on the estimates of two widely different years is not to be supported; but with a commodity going so largely into one field, wide fluctuations in the absorption by other fields are not made significant. Neither the total production of sulphuric acid nor the consumption for fertilizers is a convincing indicator of the state of activity in industry in general.

WHILE the attention of business is centered on Washington and the Mellon tax cut plan, States and municipalities continue to spend money lavishly and pile up additional tax burdens on business and individuals. The rapidity with which State and municipal obligations have grown and their proportions today are alarming. Their growth cannot continue long at the rate of the

past few years without affecting the standard of living. Bridgeport, Conn., is an example of the extent to which municipalities are crowding taxes upon business in the effort to gain revenues for the support of an extravagant government. Assessors have added approximately $16,000,000 in valuations on manufacturing and public utilities properties. The American Chain Co. has been raised from $1,259,679 to $2,202,068; the Singer Mfg. Co. from $2,343,331 to $3,067,135; the Bilton Machine Tool Co. from $629,788 to $834,660; the Bridgeport Brass Co. from $4,257,581 to $5,056,949, and other concerns in similar proportions. Against these increases the companies may appeal to the board of relief, and afterward, if necessary, to the Superior Court of Connecticut.

Developments in Steam Power Generating

JUDGING from the discussions on high steam pressures and temperatures at the power session of the last annual meeting of the American Society of Mechanical Engineers, any uncertainty regarding the ability of materials used for valves, boilers, piping, turbines, etc., to withstand the stress of steam pressures up to 1200 lb. per square inch, has disappeared. The problem now is to determine operating pressures that will assure the minimum cost of power for steam temperatures not exceeding 750 deg. Fahr., this point being described as the absolute limit with present materials.

The problem was discussed in two papers, one by W. J. Wohlenberg, assistant professor of mechanical engineering at Yale University, and the other jointly by C. F. Hirshfeld, chief of the research department of the Detroit Edison Co., and F. O. Ellenwood, professor of heat power engineering at Cornell University.

Mr. Wohlenberg finds that the thermal efficiency of a generating station falls off beyond a pressure of 1000 lb. per square inch, while Hirshfeld and Ellenwood conclude that this efficiency shows continuous improvement beyond 1200 lb. per square inch, which was the highest pressure for which they made their calculations. Taking into account investment charges, maintenance and fuel charges, the authors show that the maximum commercial efficiency is obtained at a pressure of 900 lb. per square inch, using coal costing $5 a ton and at a pressure of 1000 lb. per square inch with coal at $8 a ton. Apparently little is gained beyond pressures of 500 lb. per square inch, when coal costs $5 a ton, or 700 lb. per square inch when the cost of coal is $8 a ton.

Thus the difference of opinion regarding the pressure at which the thermal efficiency of the generating room reaches a maximum does not appear important, particularly as the characteristics of steam at high pressures are not accurately known.

C. W. E. Clarke, power engineer of Dwight P. Robinson & Co., New York, discussing the preheating of air used for combustion under boilers, gives data based on tests at the Colfax Station of the Duquesne Light Co. His contribution is particularly interesting as being the first in this country to give the actual results of tests on air preheaters in commercial operation. Mr. Clarke found that the gain in efficiency from preheating the air between 120 and 140 deg. Fahr. was 5½ to 7 per cent.

The combustible in the ash decreased between 6 and 12 per cent when the air preheater was operated, and the CO_2 content of the gases of combustion increased 0.7 to 1.4 per cent. Due to the increased CO_2 content, indicating improved combustion, the furnace temperature increased more rapidly than the windbox air temperature. The temperature of the gases leaving the boiler, on the other hand, decreased slightly when the air was preheated. The temperature of the air entering the stokers was approximately 220 deg. Fahr., and with this temperature no stoker difficulties were encountered.

Family Control and the Perpetuation of Business

THE merger in 1922 of the Winchester Co., New Haven, Conn., and the Simmons Hardware Co., St. Louis, was an event widely commented on in the manufacturing, jobbing and retail hardware trades. At the time of the merger the Simmons Hardware Co. was known as the largest hardware distributing organization in the world. In the past week has come the announcement of the retirement of George W. Simmons from active participation in the affairs of the Winchester-Simmons Co. and the Simmons Hardware Co. Mr. Simmons is the last of the three sons of E. C. Simmons to withdraw from the hardware trade and that fact and what it signifies have prompted a noteworthy editorial in the *Hardware Age* of Jan. 24. In view of its direct interest to many readers of THE IRON AGE in its applications to the metal-working field the editorial in large part is reproduced below. —EDITOR THE IRON AGE.

All of the hardware trade—manufacturers, jobbers and even little retail merchants in out-of-the-way villages and hamlets in every part of this country—will read with profound interest that the last member of the Simmons family has passed from active connection with the hardware business. It is an unusually dramatic event in the hardware trade.

The Stamp of the Founder

E. C. Simmons, the founder of this great business, was a poor boy. He went to work at an early age.

He had no background of wealth or influence. Slowly, by reason of intelligence, energy and close application, he worked his way up in the business. He was a stock clerk. He became a salesman. He carried the keys of the house, as he was the first to arrive in the morning. By reason of his service he became a partner.

At that time Waters, Simmons & Co. were a small concern doing business in a thinly settled, crude, but rapidly growing country. As their territory developed, this small house kept pace. They moved into larger buildings. They increased their stocks and the number of their salesmen and covered a wider territory. They were the first mercantile partnership to incorporate.

In his methods, E. C. Simmons was human, simple and direct. He believed in the Golden Rule and practiced it in his business. He had three great interests in life—his religon, his family and his business. Every Sunday he assembled his family and read the Ten Commandments. Night and day he thought of his business and the men who worked with him in its development. In his later years his one thought was for his sons. Realizing that human life was short, it was the great desire of his heart to perpetuate his business through his three boys.

E. C. Simmons had all the qualities of a great leader. His men believed in him absolutely. They believed in his integrity, in his fairness, in his sense of justice, and they also believed in his ability as a business man. They constantly drew into his organization good hardware men from all parts of the country. He welded them into his business. These men were loyal, practical and hard workers. Under his direction they built up the greatest hardware business in the world. Mr. Simmons made a fortune for himself and he put many other men in the line of making their own fortunes.

A Great Organization

At the pinnacle of the success of this house there was an organization of men in its various parts that probably has never been excelled in the business history of this country.

These men, like the founder, came into the business poor. Not a single man ever brought any capital into the business of the Simmons Hardware Co. All they brought was ability and a willingness to work hard. The capital came from the profits earned. These men joyfully worked together for the business.

When the sons entered the firm, there was a new era. It is a more difficult thing to hold together a large and successful business than it is to build it up. The reasons are simple and fundamental. A business has its youth and also its old age. In the youth of this house the workers were young and poor. They lived simply. Their attention was not diverted by the outside interests that come with an accumulation of years and wealth. They were satisfied with moderate salaries. They looked for their greater compensation, not from their fixed salaries, but from the earnings on the stock they had acquired in the business.

However, under the sons of Mr. Simmons much of the stock, by reason of deaths and changes, was held outside of the business. The leading men were drawing large salaries. Salesmen and other employees could not be interested by stock issues as in the old days when the business was growing so rapidly and when profits were large.

Evolution at Work

The country had developed. The local jobbers in all parts of the territory had larger capital. They were carrying more complete stocks. They were also learning lessons in salesmanship. The three sons of Mr. Simmons had a very heavy burden to carry. Expenses were high and competition was very keen. The business had grown old.

What of these sons? The oldest son, Wallace D. Simmons, was in some respects even the superior of his father. However, as was only natural on account of the difference in his education, he lacked that human touch and that understanding of the hopes and aspirations of the common, average man who makes up the great mass of the hardware and every other business. He worked early and late for the good of the business that he had inherited. He was straightforward and honest and in a situation for which he was not fitted by temperament he did his level best. Finally, at a critical period, his health failed, and in a large measure he was compelled to lay down the burden and direction of this tremendous organization.

The second son, Edward H. Simmons, was an exceedingly hard worker. He devoted his entire time and attention to the business. He gave all of his life without reservation to the increasing complications and details of this great business.

George W. Simmons, who has just retired to accept the vice-presidency of a New York bank, was the best "mixer" of the three sons. He has traveled all over the United States and has a wide acquaintance in the hardware trade. He is very popular and has a host of friends. His future career in financial circles will be watched with keen interest by all who know him.

Now let us sum up. The house of the Simmons Hardware Co. has written history large on the records of the hardware trade. Thousands of men, as employees and as customers, have been influenced by this business. What has this influence been? Has it been good or has it been evil? There is no question whatever that the Simmons Hardware Co. from the beginning to the ending stood for what was best in individual character and in the ethics of business. One man who was closely associated with E. C. Simmons for many years has written that in all these years he never knew him to do a mean thing.

What Is the Lesson?

However, in a broader sense, what lesson must we learn from the history of this business? It has been well said that every business is but the lengthened shadow of one man. In the beginning almost every business is a one-man business, but when, by reason of the ability and the genius of this one man it grows to national proportions, what of the future? Study what has happened to hundreds of great businesses in this country when the old feudal idea of divine right and the hereditary succession has prevailed. We all know. There is no more reason to believe that a son can fill the place of his father as a business genius than that a son of Caruso can succeed Caruso as a vocal wonder.

The lesson to be learned is that great businesses must be perpetuated *as institutions*. Business genius must be found somewhere to continue them, and the whole question must be not of family, not of wealth, but the simple, natural succession by reason of the business ability to handle the job.

The lesson of the rise and the passing of the Simmons family in the hardware business is no reflection whatever upon the sons of E. C. Simmons. They became enmeshed in a system in business that is fundamentally wrong. They were the greatest sufferers by reason of this system.

E. C. Simmons was a business man who stands out in a striking manner as a model for all business men in all lines to follow. His great mistake was in not understanding the fundamental principle that a business is perpetuated not by money, not by family, but by the combined genius of the people conducting the business to do it as it should be done.

Again, what's the lesson? Just as Thomas Jefferson, with his far-seeing wisdom, realized that the entailing of estates through the eldest son was not for the common good, so today it is not wise nor is it fair to the many who take part in building up a great business for that business to be entailed through a hereditary family control. Nor, as we see in this Simmons instance as in many others, is it to the interest of the business itself, nor is it good for the heirs of that business. It is contrary to the theory and practice of the best American traditions.

Iron and Steel Markets

MORE ACTIVITY IN STEEL

Increase Most Noticeable in Bars

Railroad Bridge and Track Work a Feature—Pig Iron Situation Mixed

The volume of new orders going to the steel mills continues to increase and some further additions to active capacity have been made. With the Steel Corporation's operating percentage at 83 for this week, independent companies have made a gain sufficient to put the industry on an 80 per cent basis.

Two or three weeks ago business was developing at a rate indicating that the mills would be actively employed up to April 1. Today leaders in the industry find signs pointing to large scale operations well into the second quarter.

Testimony is uniform to the increase in steel bar tonnage in the past week—an indication that demand is coming from a wide range of manufacturing uses, since the bar is the commonest form of finished rolled steel. At Chicago the week's sales of bars were the largest since last May. In addition to automobile makers, concrete bar dealers, jobbers and farm equipment companies were the chief buyers. Farm implement demand is on a scale not equaled in many months.

Several additional blast furnaces have been started by steel companies, including one at South Chicago and three by the Bethlehem Steel Corporation. The Steel Corporation's view of the scale of demand upon rolling mills in the spring months is seen in its policy of accumulating good-sized stocks of pig iron and semi-finished steel.

Recently mills were making quite prompt deliveries, but in bars the period is now six weeks with some producers. In general there is no change from the policy manufacturing buyers have been following, of buying for early use.

So far as they have developed, the plans of the railroads look to relatively larger expenditures in 1924 for bridges and track betterment than for rolling stock. Locomotive and car buying in the early months of the year do not promise to equal that of 1923 in the same period. But producers of rails, tie plates and all track supplies expect to be well occupied through the first half of the year.

Activity in the railroad equipment field is indicated by the buying of 2822 freight cars, 58 passenger cars and 13 locomotives. There are inquiries for 6800 freight cars, including 5000 for the Santa Fe. The New York Central is reported in the market for 100 locomotives. Several Western roads are expected to place additional rail orders. The Chicago & Northwestern has just closed for 20,000 tons.

Fabricated steel lettings of the past week amounted to more than 52,000 tons, the largest in months. About 4000 tons was for the railroads but 32,000 tons was for private enterprises and over 15,000 tons for public work, mostly in New York. Fresh inquiries call for more than 36,000 tons, including 8000 tons for railroads.

Independent sheet mills reporting to the Pittsburgh association sold 349,000 tons in December, against 165,000 tons in November. Shipments for the two months were 188,000 tons and 199,000 tons. Unfilled orders on Dec. 31 were 445,000 tons, or 165,000 tons more than on Nov. 30.

The volume of inquiry for pig iron shows marked increase in several districts, notably in Chicago and Philadelphia, but there is a mixed situation as to prices. In the South an advance of $1 per ton has been made, but in the Philadelphia district and at Pittsburgh prices are somewhat unsteady. Inquiries in eastern Pennsylvania include 5000 tons of basic and 5000 tons of Bessemer and a New England steel company is inquiring for 3500 tons of basic. Large speculative purchases of basic by scrap dealers in Ohio are reported, including one deal for 50,000 tons. This feature is a matter of comment, in view of the amount of iron still held by speculators who bought in the November movement.

Belgian and French steel mills have secured orders from Chile for 9000 tons of rails, from Brazil for 12,000 tons and from Finland for 12,000 tons.

British iron and steel markets are demoralized by the railroad strike and the political situation. Some works have been closed.

Further advances in foundry iron have brought THE IRON AGE pig iron composite price to $22.19, from $22.04 last week. One year ago it was $26.79.

The finished steel composite price remains at 2.789c. per lb. One year ago, at 2.489c., it was 11 per cent lower.

Pittsburgh

Buying Shows Conservative Tendency—Higher Prices Not Expected

PITTSBURGH, Jan. 22.—The steel market has not yet overcome a tendency to blow hot and cold by turns and this week it is blowing cold. Although the belief still is gaining ground that there will be a soft coal strike or at least a suspension of operations by union mines with the expiration of the present wage scale agreement on April 1, steel buyers are not yet impressed with the possibility of higher prices in the near future, or as long as deliveries of all lines continue so prompt.

The tendency is even more marked than it was recently to keep down purchases to known and actual requirements. This makes difficult the scheduling of mills for any distance ahead. The tendency to blow cold also is apparent in the pig iron market. A week ago it looked as though the market was on the verge of a turn, but the actual test in the shape of good-sized inquiries has disclosed that if the market is not actually weak, it is inclined to falter. One sale embracing foundry and malleable grades was made at a price equivalent to not over $22 at Valley furnace. As against the $22.50 price quoted by Valley furnaces on

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Jan. 22, 1924	Jan. 15, 1924	Dec. 24, 1923	Jan. 23, 1923
No. 2X, Philadelphia‡	*$24.13*	$24.26	$24.26	$29.76
No. 2, Valley furnace†	22.50	22.50	22.00	27.00
No. 2, Southern, Cin'ti†	**26.05**	25.05	25.05	28.05
No. 2, Birmingham, Ala.†	**22.00**	21.00	21.00	24.00
No. 2 foundry, Chicago*	24.00	24.00	23.00	29.00
Basic, del'd, eastern Pa.	*22.75*	23.25	23.25	28.50
Basic, Valley furnace	21.00	21.00	21.00	26.00
Valley Bessemer, del. P'gh.	24.76	24.76	24.76	29.27
Malleable, Chicago*	24.00	24.00	23.00	29.00
Malleable, Valley	22.50	22.50	20.00	27.00
Gray forge, Pittsburgh	*23.26*	23.76	23.26	28.27
L. S. charcoal, Chicago	29.15	29.15	29.15	33.15
Ferromanganese, furnace	109.00	109.00	109.00	107.50

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	40.00	40.00	40.00	37.50
O.-h. billets, Pittsburgh	40.00	40.00	40.00	37.50
O.-h. sheet bars, P'gh.	42.50	42.50	42.50	37.50
Forging billets, base, P'gh.	45.00	45.00	45.00	43.00
O.-h. billets, Phila.	45.17	45.17	45.17	45.17
Wire rods, Pittsburgh	51.00	51.00	51.00	47.50
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh. lb.	2.35	2.35	2.35	2.00
Light rails at mill	2.25	2.25	2.25	2.15

Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.62	2.62	2.62	2.475
Iron bars, Chicago	2.40	2.40	2.40	2.35
Steel bars, Pittsburgh	2.40	2.40	2.40	2.10
Steel bars, Chicago	2.50	2.50	2.50	2.10
Steel bars, New York	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh	2.50	2.50	2.50	2.10
Tank plates, Chicago	2.60	2.60	2.60	2.30
Tank plates, New York	2.74	2.74	2.74	2.44
Beams, Pittsburgh	2.50	2.50	2.50	2.10
Beams, Chicago	2.60	2.60	2.60	2.20
Beams, New York	2.74	2.74	2.74	2.44
Steel hoops, Pittsburgh	3.00	3.00	3.00	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Jan. 22, 1924	Jan. 15, 1924	Dec. 24, 1923	Jan. 23, 1923
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.85	3.85	3.75	3.35
Sheets, galv., No. 28, P'gh.	5.00	5.00	4.90	4.35
Sheets, blue an'l'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh	3.00	3.00	3.00	2.70
Plain wire, Pittsburgh	2.75	2.75	2.75	2.45
Barbed wire, galv., P'gh.	3.80	3.80	3.80	3.35
Tin plate, 100-lb. box, P'gh.	$5.50	$5.50	$5.50	$4.75

Old Material, Per Gross Ton:				
Carwheels, Chicago	**$21.00**	$20.50	$20.50	$27.00
Carwheels, Philadelphia	**21.00**	20.00	19.50	23.50
Heavy steel scrap, P'gh.	**22.00**	21.50	19.00	22.00
Heavy steel scrap, Phila.	**19.00**	18.00	17.50	21.00
Heavy steel scrap, Ch'go.	**18.50**	17.00	17.25	19.25
No. 1 cast, Pittsburgh	21.00	21.00	21.50	24.00
No. 1 cast, Philadelphia	**21.00**	20.50	21.00	24.00
No. 1 cast, Ch'go (net ton)	20.50	20.50	20.00	21.50
No. 1 RR. wrot. Phila.	**22.00**	21.50	19.00	23.00
No. 1 RR. wrot. Ch'go (net)	**15.50**	15.00	16.00	18.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$4.00	$8.00
Foundry coke, prompt	4.75	4.75	4.75	8.50

Metals				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	**13.00**	12.75	13.25	14.87½
Electrolytic copper, refinery	**12.37½**	12.25	12.87½	14.50
Zinc, St. Louis	**6.50**	6.35	6.25	6.75
Zinc, New York	**6.85**	6.70	6.60	7.10
Lead, St. Louis	**8.10**	8.00	7.75	8.00
Lead, New York	**8.37½**	8.25	8.00	8.25
Tin (Straits), New York	**50.00**	49.50	47.30	40.00
Antimony (Asiatic), N. Y.	**10.50**	10.00	10.25	6.85

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Jan. 22, 1924, Finished Steel, 2.789c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Jan. 15, 1924,	2.789c.
Dec. 24, 1923,	2.775c.
Jan. 23, 1923,	2.489c.
10-year pre-war average,	1.689c.

Composite Price, Jan. 22, 1924, Pig Iron, $22.19 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Jan. 15, 1924,	$22.04
Dec. 24, 1923,	21.88
Jan. 23, 1923,	26.79
10-year pre-war average,	15.72

No. 2 foundry and malleable iron, there have been sales of basic iron at $22.26, delivered Pittsburgh, and of gray forge iron at $23.26, delivered Pittsburgh.

The scrap market also has lost some of its recent buoyancy, and while sales of heavy melting steel have been made as high as $23 in the week under review, melters have passed up offerings of this grade at $22 in the past few days. The coke market, however, retained its recent improvement.

Steel plant activities still reflect the fact that manufacturers have good-sized order books against production over the next 60 days. The Carnegie Steel Co. has 45 of its 59 blast furnaces in production, and its steel works this week are scheduled for 90 per cent of ingot capacity. There is some doubt, however, that this rate can be attained because extremely cold weather has resulted in a shortage of gas. Other Steel Corporation subsidiaries also are operating at a very high rate with the American Sheet & Tin Plate Co. running as full as is physically possible in its tin mills. Relatively full operations of the Steel Corporation are not entirely ascribed to orders, being partly a reflection of the confidence the Steel Corporation has in the future shown by building up its stock of pig iron and semi-finished steel. It is said that stocks of these materials approach record proportions. Independent steel company operations in this and nearby districts are averaging somewhat above 75 per cent capacity in the steel works and even higher in the finishing mills, notably the sheet mills.

Pig Iron.—The market has shown a little more life the past week than it did previously for several weeks, but the gain in sales has been at the expense of prices. The Westinghouse Air Brake Co., which recently put

out an inquiry for 5000 tons of foundry and malleable iron, actually bought 10,000 tons from a western Pennsylvania furnace at a delivered price of $23.76 for the iron purchased, which included No. 2X, No. 2, No. 3 foundry and malleable grades. This would figure back to $22, Valley furnace, for No. 2 iron and for the malleable, which Valley furnaces lately have been quoting at $22.50. We also note sales of 5000 tons of gray forge iron at $23.26, delivered Pittsburgh, or 50c. a ton below the Valley furnace quotation. Small sales of Bessemer iron have been made at $23, but efforts to uncover consumers of basic iron who would pay the prices reported to have been offered by scrap dealers have been unsuccessful. The National Malleable Castings Co., Sharon, Pa., is in the market for 2000 tons of basic and has had a quotation of $22, delivered. Basic iron has been sold in the past week at $20.50, furnace, but not by producers in the Valley district. An element of weakness in the situation is the fact that there is so much pig iron in speculative hands and such holders are reported to be getting somewhat uneasy over the failure of demand to improve. The Bethlehem Steel Co. has put on another furnace since a week ago at Johnstown, Pa., and now has five of the 11 stacks at that plant in production. Of the 141 furnaces in this and nearby districts, 98 are now in production.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$21.00
Bessemer	23.00
Gray forge	$22.00 to 22.50
No. 2 foundry	22.50 to 23.00
No. 3 foundry	22.00 to 22.50
Malleable	22.50 to 23.00
Low phosphorus, copper free	29.00

Ferroalloys.—Demand is steady rather than active. This is particularly true of ferromanganese in which the buying runs chiefly to the nearby requirements of consumers. There is still some irregularity in the prices of this material and while there is no sign of a reduction, it is evidently believed that advances are not immediately ahead. Leading domestic producer holds at $109, seaboard, with the usual discount of ½ of 1 per cent for cash in 10 days. British producers generally are quoting $110, c.i.f. Atlantic seaboard, duty paid, but in some cases a discount of $1 per ton is allowed for cash in 30 days. Much tonnage of 50 per cent ferrosilicon has been booked for 1924 delivery, the bulk of it at $75, delivered, but in a few cases that price was shaded $1 to $2 per ton. A few fair-sized contracts for spiegeleisen have been booked at $38, furnace for 19 to 21 per cent material. For small tonnages, the asking price is $2 per ton more. Prices are given on page 333.

Semi-Finished Steel.—This market is growing stronger. A Pittsburgh district sheet maker recently was able to cover against his first quarter requirements, amounting to about 50,000 tons, at less than $42.50, Pittsburgh, but as a rule that price is closely observed by makers in this and the Youngstown districts. A sale of 5000 tons of slabs recently was made at $42.50 f.o.b. Ashland, Ky., for delivery to a central Ohio strip mill. It is believed that this price was possible because of a freight advantage to destination over Pittsburgh or because of special analysis of the steel. Certainly, slabs still are available from mills in this district at $40, Pittsburgh. Recent efforts of sheet makers to uncover lower prices than $42.50 for sheet bars have been unsuccessful and the market is firmer on slabs in view of a recent sale of 5000 tons to a central Ohio maker of strips at $42.50, f.o.b. Ashland, Ky. Based on recent sales, billets are not quotable above $40 and few, if any, of the mills are insisting on a differential for the sizes smaller than 4-in. There is little activity in forging billets, skelp or wire rods. Users of the latter product are buying very close to actual requirements and are not specifying against contracts with much freedom. There is improvement in the demand for wire products and also in bolts and rivets, but it is not of a character to make for urgency in the demand for the raw material. Prices are given on page 333.

Wire Products.—Buying shows a material betterment over that of the last two months of last year, but it is not yet up to expectations, which were for a brisk demand following the abstemious buying of November and December and the fact that prices failed to weaken over the turn of the year. Buyers are getting such good deliveries against orders and there is so little to suggest higher prices in the near future that the tendency is to buy closer to actual needs than was the case a year ago. Producers are urging more forward buying on the score that if the building program is on the scale this year it now promises to be, a shortage of common labor is likely and activities of wire mills will be restricted at a time when the demand is heaviest. Wire mills in this territory are averaging about 65 to 70 per cent of capacity operations. Observance of quoted prices is general. Prices are given on page 332.

Steel Rails.—Light rails still are in very limited demand and on billet rails there is again some uncertainty as to prices. While the common quotation of the three producers in this district still is 2.25c., base, it is admitted that business has been lost at that price. This does not necessarily mean that a lower price was made, as the quotation being f.o.b., mill, the delivered price varies in accordance with the freight rate to destination. Billet rail makers still claim to be coming across prices on rerolled rails well below 2.25c., in some cases as much as $10 per ton under that level. (Repeat last week's prices).

We quote light rails rolled from billets at 2.25c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, $43 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—Optimistic reports still are made by pipe makers, particularly with regard to standard pipe, for which the demand still is described as heavy. The reaction to the improved oil situation has not yet become apparent in actual orders for oil country pipe, but inquiry is much livelier than it has been and greatly increased orders are expected as spring approaches. Welded boiler tubes are slow and easy and there are intimations that on large tonnages of seamless tubes, the quoted discounts are not always observed. Discounts are given on page 332.

Sheets.—Independent makers have lined up a good volume of orders and there is better engagement of independent capacity than before in about three months. Several makers, whose product goes principally to the automotive industry, have their plants on full and the general average of independent mill operations is slightly above 80 per cent. This is somewhat above the current rate of the American Sheet & Tin Plate Co., which is not as well supplied with business as the independents as a class. Practically all makers now are holding 3.85c., base, for black sheets, 5c., base, for galvanized, 3c., base, for blue annealed and 5.35c. for automobile body stock, but a rather generous amount of independent bookings was at less than these prices. Prices are given on page 332.

Tin Plate.—Producers are experiencing no difficulty in obtaining specifications on contracts and there is much less than the usual storing of product in mill warehouses against future requirements than is sometimes the case at this time of the year. There are no suggestions of prices below the regular quotations; indeed, the market is firm, with sheet bars well established at $42.50 and pig tin prices again moving upward.

Cold-Finished Steel Bars and Shafting.—Real activity is lacking, but consumers are ordering steadily and makers describe business as satisfactory. Deliveries are so good that few consumers or jobbers feel the necessity of placing orders much in advance of their actual requirements. There is close observance by local makers of a base of 3c., Pittsburgh, with freight equalized with Chicago in competitive territory. Ground shafting holds at 3.40c., base, f.o.b. mill, for lots of a carload or more.

Steel Chain.—Leading producers have issued new price lists in which prices of practically all kinds of pound chains have been reduced $10 per ton on sizes 9-16-in. and larger and $15 a ton on the sizes under 9-16-in. No change has been made in prices of con-

veyor chain cold shuts, loading chain, slip and grab hooks, cold shuts, the higher grades of dredge chain, dredge chain cold shuts, or electrically welded chain. The new base is $6 per 100 lb., as against the former base of $6.50, established last October.

Track Supplies.—New business is not very heavy with local makers, but they are generally well provided with orders for large spikes and tie plates. Price ranges are the same as those of the past few weeks. Small spikes are held pretty firmly despite a very light demand. Prices are given on page 332.

Structural Material.—Fabricating shops are specifying freely against all tonnages on contract and are building up their stocks, since awards of fabricated steel to local shops are not particularly heavy. This is rather convincing testimony that lower prices than now prevail are not expected. Judging from the activity of the drawing rooms of fabricators, a big construction year is ahead. Plain material prices are given on page 332.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, $3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

Iron and Steel Bars.—The most impressive feature of the steel bar market is its strength. Repeated efforts by buyers to secure concessions have failed, all makers being very firm at 2.40c., base Pittsburgh. Business is good, but demand reflects the belief among buyers that higher prices are not immediately ahead. There is only a fair demand for iron bars, but there is pretty close adherence to recent prices.

Plates.—Evidently the Carnegie Steel Co. has fared somewhat better than competing companies in the distribution of plate tonnages, as its plate mills are running more than 90 per cent full. General demand for plates is not as strong as that in the other heavy tonnage products. Action of the Interstate Commerce Commission in ordering a number of the locomotives of the Pennsylvania Railroad into the repair shops encourages expectation of locomotive purchases by that road, but there are also suggestions that it had as many idle locomotives as have been ordered repaired. Local car building companies have very little work in sight All mills are holding firmly to 2.50c., base. Prices are given on page 332.

Hot-Rolled Flats.—Mills in this district are well supplied with orders for delivery over the present quarter, but some of them still lack early shipment tonnages and this accounts for some irregularity in prices, a price of 2.90c., base, appearing from time to time as against 3c., base, the regular quotation. Prices are given on page 332.

Cold-Rolled Strips.—New business is rather light, but makers are well sold up against first quarter production and buyers are reported to be specifying well. There are no important deviations from the regular price of 5c., base, Pittsburgh.

Bolts, Nuts and Rivets.—Buyers are specifying fairly freely, but there is not the snap to either shipping instructions or new buying that is so pleasing to the manufacturers. Buyers evidently feel safe in covering merely their most pressing requirements in the belief that prices are not going to be higher right away. Indeed, the fact that some concessions still are being made encourages such a buying policy. Prices and discounts are given on page 332.

Coke and Coal.—The coke market retains its recent firmness and we continue the prices established a week ago. Spot offerings of strictly standard furnace coke are not at all large, and little difficulty is experienced in selling such coke at $4 per net ton at ovens. Off grade furnace coke still can be had at $3.75, but it is hardly suitable for blast furnace use and rather costly for heating purposes, since strictly heating coke can be had at $3.25 to $3.50. The contract price for furnace coke for shipment over the remainder of the present quarter has settled to $4.25. This was the price paid on three contracts recently closed. Negotiations for second quarter tonnages have started in a small way and have brought out one quotation of $4.45. The supply of foundry coke is ample for current demands and except for one or two special brands, the market is quotable from $4.75 to $5.25. Coal prices are fairly firm at last week's levels. We quote mine run steam coal from $1.60 to $2 per net ton at mines, coking coal from $1.85 to $2.15 and gas coal from $2.25 to $2.50. Steam slack coal commands $1.60 to $1.65 and gas slack, $1.75.

Old Material.—The market here appears to have reached a resting point, following a sale of 10,000 tons of heavy melting steel at $23, delivered Steubenville, and efforts within the past few days on the part of dealers to interest consumers in supplies of this grade at as low as $22 have been unsuccessful. Practically all steel companies in this and nearby districts now have a fair sized stock of scrap and are not interested in the market at the present time. We quote this grade at $22 to $23, but it is doubtful whether more than the lower quotation today could be obtained. The recent sale of heavy melting steel at $23, delivered Vandergrift, Pa., was of No. 1 railroad steel which ordinarily commands a premium of 75c. to $1 a ton over ordinary heavy melting grade. Blast furnace material is scarce and very firm.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

	Per Gross Ton
Heavy melting steel	$22.00 to $23.00
No. 1 cast, cupola size	21.00 to 21.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa	22.00 to 22.50
Compressed sheet steel	19.00 to 19.50
Bundled sheets, sides and ends	17.50 to 18.00
Railroad knuckles and couplers	22.50 to 23.00
Railroad coil and leaf springs	22.50 to 23.00
Low phosphorus blooms and billets ends	24.00 to 24.50
Low phosphorus plate and other material	23.00 to 23.50
Railroad malleable	19.50 to 20.00
Steel car axles	22.50 to 23.00
Cast iron wheels	19.50 to 20.00
Rolled steel wheels	22.00 to 23.00
Machine shop turnings	16.00 to 16.50
Steel bar crops	21.50 to 22.00
Heavy steel axle turnings	18.00 to 19.00
Short shoveling turnings	17.50 to 18.00
Heavy breakable cast	19.00 to 19.50
Stove plate	15.00 to 16.00
Cast iron borings	17.50 to 18.00
No. 1 railroad wrought	16.00 to 16.50
No. 2 railroad wrought	21.50 to 22.00

Detroit Scrap Market

DETROIT, Jan. 22.—There is a peculiar situation in the scrap market in that it has advanced steadily and abnormally in relation to the current prices on pig iron. Melters are inquiring for additional pig iron tonnage with the result that the market on old material has been practically at a standstill during the past week. Dealers are showing more of a tendency to offer tonnage which they have held in reserve and this may mean a slight break in prices in the near future. Prices are practically the same as those quoted a week ago.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting steel	$16.75 to $17.25
Shoveling steel	16.75 to 17.25
Borings	13.00 to 13.50
Short turnings	13.00 to 13.50
Long turnings	12.00 to 12.50
No. 1 machinery cast	18.00 to 19.00
Automobile cast	24.00 to 26.00
Hydraulic compressed	14.50 to 15.00
Stove plate	16.50 to 17.50
No. 1 busheling	12.50 to 13.00
Sheet clippings	11.50 to 12.00
Flashings	12.50 to 13.00

Compressed Air Trade Standards

Engineers interested in compressed air have expressed their appreciation of the pamphlet recently published by the Compressed Air Society on standards for compressed air equipment, referred to in THE IRON AGE of Dec. 27, and several technical schools have ordered a supply for the use of their students. Copies may be had by addressing the society at 50 Church Street, New York.

Chicago

Increased Demand for Finished Steel—More Activity in Pig Iron

CHICAGO, Jan. 22.—Demand for finished steel is gradually broadening and now embraces a wide range of industries. Mill bookings are on a steadily increasing scale; in fact, sales of the leading producer during the first 15 days of January were nearly double those for the same period in December, not including tonnage actually sold but not yet entered on the books. Bar tonnage booked during the past week was particularly heavy, being the largest since last May. Automotive interests, the railroads and the building industries continue to be leading factors in the market. Automobile manufacturers bought heavily last week. In the building field the most important fabricating award was 7000 tons for the Chicago Tribune Tower Building. Among large new projects is the Snelling-Mendota Bridge, Minneapolis, which will take 7500 tons of structural steel according to one plan and 3000 tons of reinforcing bars according to an alternate plan.

The comprehensive car buying programs contemplated by a number of railroads are gradually reaching the inquiry stage. The Santa Fe is now asking for figures on 5000 freight cars and will soon put out inquiries for considerable passenger equipment. Purchases of steel by farm equipment makers are assuming proportions not reached since the slump in agricultural products set in.

Mill operations continue to reflect improved business conditions. The Illinois Steel Co. will blow in an additional furnace at South Works this week, bringing the total number of active stacks up to 21 out of 27. The company's steel output for the week will probably average 90 per cent of ingot capacity. The Inland Steel Co. remains on a 75 per cent basis.

Pig Iron.—The market appears to be in the inception of another buying movement of large proportions. Inquiries are numerous and sales during the week have ranged from car lots up to 6500 tons. Most of the current buying is for second quarter delivery, possibly indicating a desire on the part of melters to get under cover before the effects of the threatened coal strike are felt. In contrast with the buying movement of last November, gray iron foundries are figuring more prominently than malleable plants. This is regarded as a reflection of a revival in activity among farm equipment makers. A Wisconsin melter has closed for 4500 tons of foundry, 2000 tons of charcoal and 500 tons of silvery and other specialties for second quarter. A local user has placed 2000 tons of foundry for the same delivery. Another Chicago melter has bought 1000 tons of foundry for second quarter, while a local railroad equipment maker has purchased 1000 tons of foundry for the current quarter. An automobile castings maker in western Michigan has placed 500 tons of foundry for second quarter. A Chicago steel foundry has closed for 500 tons of Bessemer and an equal tonnage of low phosphorus reported to have been bought at $34, delivered. A Milwaukee buyer is in the market for 1000 tons of low phosphorus for February, March and April delivery. It is reported that English low phosphorus has been offered on the market at less than domestic prices, but no sales have yet been made in this section. Local prices are firm at $24, base furnace, and one producer has made a few sales at an advance of 50c. over that quotation. The psychology of the market has changed markedly within the past two months. During the long period of receding business when iron dropped approximately $10 a ton and scrap a proportionate amount, it was said that finished steel prices would have to come down because primary material had declined. Now with steel prices well established by virtue of a revival in demand, the common expectation is for an upward adjustment of pig iron prices to bring them into a more normal relationship with steel. It is to be noted that scrap prices, which respond much more quickly to changed market conditions, have been advancing steadily for some time. A Michigan melter has bought 200 tons of 8 per cent silvery at the Jackson County schedule. It is probable that miscellaneous sales of silvery during the week exceeded 2500 tons. A local user wants 650 tons of 6 per cent for 60-day delivery. A number of Southern furnaces have advanced prices to $23, base Birmingham, and the lowest going quotation now appears to be $22.50. A local melter bought 500 tons of Southern foundry at the latter price.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal averaging sil. 1.50, delivered at Chicago..	$29.15
Northern coke, No. 1, sil. 2.25 to 2.75	24.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	24.00
Malleable, not over 2.25 sil.	24.00
Basic	24.00
High phosphorus	24.00
Southern No. 2	28.51
Low phos., sil. 1 to 2 per cent, copper free	$34.00 to 34.79
Silvery, sil. 8 per cent	37.29

Ferroalloys.—Foreign competition is being felt by producers of spiegeleisen. A purchase of 500 tons for various Western destinations brought out a price of less than $37.50, New Orleans. Smaller lots have been placed at $38, New Orleans. There continue to be sales of domestic material, because of the greater certainty as to deliveries, at as high as $40, Eastern furnace. The going prices on ferromanganese are $109, Baltimore, for domestic material, and $110, New Orleans, for foreign.

We quote 80 per cent ferromanganese, $117.38 to $117.56, delivered; 50 per cent ferrosilicon, $75, delivered; spiegeleisen, 18 to 22 per cent, domestic, $47.58 to $48.58, delivered; foreign, $37.50 to $38, New Orleans.

Plates.—Prospects are regarded as favorable for a continuation of railroad car buying, which, of course, means plate business for the mills. Oil storage tank buying has been quiescent for several months, but the construction of a number of tanks recently authorized by the Standard Oil Co. of Indiana will involve 5000 tons of plates. Part of these tanks will be fabricated at the company's own plant at Whiting, Ind., and the remainder will be built by the Chicago Bridge & Iron Works. Demand for plates from jobbers and miscellaneous users is in good volume.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Bars.—The leading local interest has booked the heaviest week's business in soft steel bars since last May. Orders are coming from a wide range of industries as well as from jobbers and concrete bar dealers. Automobile manufacturers bought heavily during the week; their purchases of bars, forging steel, alloy steel, sheets, structural steel and hot strip are said to have run into hundreds of thousands of tons. Farm implement makers are buying more liberally; orders placed by a leading manufacturer of this class with a local mill are the heaviest ever received from it by that producer. In contrast with soft steel, bar iron is quiet and mills find it difficult to maintain single turn operations. Yet with scrap costs rising steadily, they feel that an advance from 2.40c. to 2.50c. mill will soon become imperative. Reinforcing business, fence post buying and materially better demand from implement makers have all contributed in putting rail steel bar mills in a more comfortable position. Rail steel bar prices are firm at 2.30c. mill.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4c. for rounds and 4.50c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.75c. to 3c. base; hoops, 4.45c.; bands, 3.95c.

Cast Iron Pipe.—Demand from municipalities is in good volume, and private business is said to be the heaviest in history. The United States Cast Iron Pipe & Foundry Co. is low bidder on 1000 tons for Cincinnati. Appleton, Wis., has awarded 400 tons of De-

Lavaud centrifugal pipe to the National Cast Iron Pipe Co. Pending business includes:

Detroit, 11,000 tons of 6-, 8-, 12- and 16-in. Bids to be in Jan. 28.

Bloomington, Ind., 313 tons of 12- to 16-in. and 643 tons of 16- to 18-in., Jan. 29.

South Bend, Ind., 1500 tons, date of letting not yet set.

Milwaukee, Wis., 2500 tons of Class C water pipe, including 600 tons of 6-in., 900 tons of 8-in., 500 tons of 12-in., 500 tons of 16-in., and 150 tons special castings, Jan. 24.

Two Rivers, Wis, 150 tons of 4- to 8-in., Jan. 25.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $60.20 to $61.20; 6-in. to 10-in., inclusive, $56.20 to $57.20; 12-in. and above, $55.20; class A and gas pipe, $5 extra.

Bolts and Nuts.—Business, although improved, is not yet heavy and it is evident that many consumers and jobbers still have stocks which they accumulated during the closing months of 1923, when the market was weak. Indications for the future, however, are favorable, and demand from the automobile industry has been particularly active. The Ford Motor Co. last week placed orders for its February requirements.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.95c.; machine bolts up to ¾ x 4 in., 55 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to ¾ x 6 in., 50 and 5 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagons, tapped, $3.50 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

Sheets.—Heavy buying by the automobile industry has further improved the position of the mills and prices are firm at a single level.

Mill quotations are 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4c. for blue annealed, 4.70c. for black and 5.85c. for galvanized.

Rails and Track Supplies.—Miscellaneous orders for rails booked locally last week aggregate 12,000 tons. The Northern Pacific, the Great Northern, the Soo Line, the Burlington and the Northwestern are all expected to come into the market for rails, but at the moment interest is centered in track supplies. In the past 30 days fully 150,000 kegs of spikes and bolts have been booked by local mills. A heavy tonnage of tie plates is pending, inquiries now being before the trade from the Great Northern, the Northern Pacific, the Soo Line, the Pennsylvania, the Pere Marquette, the Missouri Pacific and the Wabash. Demand for light rails shows slight improvement.

Standard Bessemer and open-hearth rails, $43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.10c. mill; track bolts with square nuts, 4.10c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.75c. base, and track bolts, 4.75c. base.

Structural Material.—Heavy inquiries and liberal lettings continue to characterize the situation in the fabricating field. The superstructure for the Chicago Tribune Tower Building, involving 7000 tons, has been placed with the American Bridge Co. The same fabricator has been awarded 1700 tons of bridge work by the Northern Pacific. The Llewellyn Iron Works will fabricate 1800 tons for a Los Angeles museum. Bids on the steel for the New Palmer House, Chicago, requiring 17,000 tons, will be opened Feb. 1. Transmission towers to be erected for the Illinois Light & Power Co., Peoria, Ill., will take 1500 tons. The city of Chicago has an unusually heavy school construction program embracing 30 buildings and from 50,000 to 60,000 tons. Some fabricators have accumulated comfortable forward bookings, while others are still in need of work.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Wire Products.—Although mills are still able to make prompt deliveries from the stocks accumulated in their warehouses, they are booking new business at a heavier rate than for several months. Manufacturing consumers have bought liberally and jobbers, except in the Northwest, are also showing increased interest in their requirements. Demand for nails is particularly active, although current inquiries also cover most other forms of wire products. Mill prices, which are firm, are shown on page 332.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, $3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, 3.65c. to 3.80c. per 100 lb.; cement coated nails, 3.10c. to 3.25c. per keg.

Reinforcing Bars.—With the steady expansion of building activity, concrete bar prices are strengthening and 3c., Chicago warehouse, is more generally observed. Among new prospects are a storage warehouse for the Central Cold Storage Co. at Blue Island, Ill., requiring 330 tons, and a group of four buildings at the University of Illinois, Urbana, requiring 300 tons. The Hagemann-Harris Co., New York, is low bidder on the general contract for the Tribune Tower Building, Chicago, which will require 150 tons of bars.

Lettings include:

Nurses' Home, University Hospital, Ann Arbor, Mich., 200 tons to Kalman Steel Co.

Chicago, Burlington & Quincy Railroad, 200 tons to American System of Reinforcing.

High school building, Sioux City, Iowa, 190 tons to Concrete Engineering Co.

Chicago Pottery Co. plant, Chicago, 150 tons of rail steel bars to Calumet Steel Co.

Federal aid bridge, Hubbleton, Wis., 100 tons to Corrugated Bar Co.

Factory for Kinnear Mfg. Co., Niles, Mich., 100 tons to Kalman Steel Co.

Pending business includes:

Central Cold Storage Co. building, Blue Island, Ill., 330 tons.

University of Illinois, Urbana, Ill., group of four buildings, 300 tons.

Chicago, Milwaukee & St. Paul Railroad, 100 tons.

Memorial Residential Hall, University of Indiana, Bloomington, Ind., 100 tons.

Old Material.—Although it has been strongly rumored that the Illinois Steel Co. has purchased from 15,000 to 30,000 tons of heavy melting for Gary at $18.50 delivered, the report is officially denied by the supposed buyer. Nevertheless, prices are strong and have advanced, as would have been expected if such a sale had been made. The rise in quotations, however, may be accounted for by the strength shown in centers East of here. Heavy melting is reported to be bringing as high as $23.50 gross at Valley points, and a local sale of 1000 tons for shipment East brought $18.50 per gross ton Chicago. Rolling mill grades are quiet, although influenced by the strength in melting steel, and demand for cast scrap is confined to scattering lots. There are good prospects for business in rerolling rails, although supply is none too plentiful. A large local consumer is in the market for a considerable tonnage in low phosphorus grades. There are no railroad offerings this week and scrap shipments since the first of the year have declined due to weather.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$21.00 to $21.50
Cast iron car wheels	21.00 to 21.50
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Forged steel car wheels	21.00 to 21.50
Railroad tires, charging box size	21.50 to 22.00
Railroad leaf springs, cut apart	21.50 to 22.00
Rails for rerolling	19.50 to 20.00
Steel rails, less than 3 ft.	20.50 to 21.00
Heavy melting steel	18.50 to 19.00
Frogs, switches and guards cut apart	18.50 to 19.00
Shoveling steel	17.25 to 18.50
Drop forge flashings	13.00 to 13.50
Hydraulic compressed sheets	15.00 to 15.50
Axle turnings	15.50 to 16.00
Steel angle bars	19.50 to 20.00

Per Net Ton

Iron angle and splice bars	21.00 to 21.50
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	27.00 to 27.50
Steel car axles	19.00 to 19.50
No. 1 busheling	14.50 to 15.00
No. 2 busheling	10.00 to 10.50
Cut forge	16.50 to 17.00
Pipes and flues	12.00 to 12.50
No. 1 railroad wrought	15.50 to 16.00
No. 2 railroad wrought	16.50 to 17.00
Steel knuckles and couplers	19.25 to 19.75
Coil springs	20.50 to 21.00
No. 1 machinery cast	20.50 to 21.00
No. 1 railroad cast	19.50 to 20.00
No. 1 agricultural cast	19.50 to 20.00
Low phos. punchings	17.00 to 17.50
Locomotive tires, smooth	18.50 to 19.00
Machine shop turnings	10.00 to 10.50
Cast borings	12.50 to 13.00
Short shoveling turnings	12.50 to 13.00
Stove plate	17.00 to 17.50
Grate bars	16.00 to 16.50
Brake shoes	17.00 to 17.50
Railroad malleable	19.25 to 19.75
Agricultural malleable	19.25 to 19.75

New York

Steel Buying Expanding, but Still Chiefly for Early Needs

NEW YORK, Jan. 22.—The increased activity in the pig iron market reported last week has been maintained and sales have amounted to about 8000 tons, while inquiries pending amount to about 10,000 tons. Owing to the high price of scrap, some foundries have purchased off-grade pig iron instead of scrap. The Worthington Pump & Machinery Corporation has covered for a part of its requirements, but is still in the market for about 3500 tons for its various plants. A chain company is in the market for 900 tons of malleable and another company for 1200 tons of foundry grades, while iron of special analysis is called for by a melter who is asking for 2000 to 3000 tons for first quarter delivery. While it is possible to buy on a basis of $22.50, eastern Pennsylvania, $23 is the usual quotation and $22 is ordinarily paid for Buffalo iron, but some furnaces are quoting as high as $23.

We quote delivered in the New York district as follows, having added to furnace price $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25	$26.27 to $26.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	25.77 to 26.27
East. Pa. No. 2, sil. 1.75 to 2.25	25.27 to 25.77
Buffalo, sil. 1.75 to 2.25	26.91
No. 2X Virginia, sil. 2.25 to 2.75	30.44
No. 2 Virginia, sil. 1.75 to 2.25	29.94

Ferroalloys.—Sales of ferromanganese have been fairly liberal and have been made up of both British and domestic alloys. Some consumers have entered the market for quantities ranging from 1000 to 3000 tons each and there have been frequent sales of carload and larger lots. Most of the buying has been for early shipment. It is estimated that in the last two or three weeks sales of both British and domestic alloys have amounted to several thousand tons of each grade. Demand for spiegeleisen is not heavy, but is confined to carload lots at prevailing prices; now and then sales of small quantities of the British alloy are noted. Contracts having been made for both 50 and 75 per cent ferrosilicon and for standard ferrochromium for this year's needs by regular consumers, these markets are featureless, with prices firm and unchanged.

Cast Iron Pipe.—Buying continues fair, although, as yet, none of the municipal tenders from New England states has appeared. The Department of Water Supply, Gas and Electricity, New York, will open bids Jan. 31, on 5000 to 6000 tons of water pipe. Price concessions are still being made for winter shipment. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $61.60 to $63.60; 4-in. and 5-in., $66.60 to $68.60; 3-in., $76.60 to $78.60, with $5 additional for Class A and gas pipe. Jobbers are offering to contract for soil pipe at the higher discounts quoted and makers are in some cases booking for delivery during the first half. Some foundries, however, anticipating a firmer market as the year advances, are unwilling to commit themselves at low prices too early in the year. We quote discounts of both Southern and Northern makers, f.o.b. New York, in carload lots, as follows: 6-in., 29½ and 35¾ per cent off list; heavy, 39½ and 45¾ per cent off list.

Warehouse Business.—There is still a light demand for structural material. Otherwise the market is quiet with only a fair volume of business in evidence. Sheets continue fairly firm, although demand is not heavy. Sellers of pipe report some business in pipe for installation on merchant ships being converted to oil burners, and prospects for an active spring demand are considered good. Prices on most products continue firm. We quote prices on page 352.

Finished Iron and Steel.—While there has been a decided gain in the total of steel orders placed so far this month over December rate, business is not assuming the large proportion which marked the first month of 1923. Except in tin plate and pipe there are no large backlogs on mill order books, and the situation continues to be favorable to the buyer both as to price and delivery. With no immediate prospect of price advances, the consumer is content to cover only for his nearby requirements. The most encouraging sign is that mill operations have shown a substantial gain over the last quarter of 1923. Current demand for structural material, bars, sheets, pipe and rail track supplies is fairly promising. Plate demand, while showing some gain over last month, is still so far from the capacity of the mills that profitable operation is not possible for some companies. The largest inquiry for plates covers 3000 tons for a fabricated water pipe line to Staten Island, bids being taken by the City of New York. Structural work is fairly active and the volume of work in architects' offices is said to be large. A new hotel to be built on the site of the Savoy, Fifth Avenue and Fifty-ninth Street, New York, will take probably 15,000 to 20,000 tons, but bids have not yet been asked for. Eastern car builders are quoting on 5000 cars just inquired for by the Santa Fe. Orders for cars since Dec. 28, as estimated by a car builder, total 13,445, exclusive of passenger cars. The final quarter of 1923 was one of the most active periods in structural steel work within the recollection of the local fabricating trade. A careful estimate by an independent fabricator of the total tonnage put under contract is 450,000 tons for the three months' period, this being exclusively for buildings, and not including subways, elevated railroads or bridges.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

Old Material.—Anticipating a further rise in prices of heavy melting steel, dealers through the East shipped rather heavily to eastern Pennsylvania mills, and one large consumer received more material than was needed for immediate requirements. As a result it offered only the current price. While this has brought a slight weakness in the Eastern market, the demand from the Pittsburgh district continues strong. Dealers report no great difficulty in obtaining heavy melting steel delivered eastern Pennsylvania at $17.50 per ton. However, some shipments are still going forward to western Pennsylvania at the advanced prices. Specification pipe is fairly firm at $17, eastern Pennsylvania. Forge fire is bringing $15.50 to $16.50 per ton delivered. On cast borings, $15 per ton about represents the present market delivered eastern Pennsylvania. Machine shop turnings are firm at $15.50 per ton and borings and turnings, quoted at $12.50 per ton delivered to an eastern Pennsylvania consumer with a low freight rate, are $17 to $17.25 per ton delivered to the West. Stove plate is firm at $17.50 per ton delivered to an eastern Pennsylvania user, but dealers buying for delivery to New Jersey foundries are paying 25c. per ton less than in the past few weeks, $16.25 per ton being about the top price today. Relaying rails are quiet, with the buying price unchanged at $25 to $26 per ton, New York. Rerolling rails, however, are quotable at $18 to $19, sales being reported at $20.50 and $21 per ton, delivered.

Buying prices per gross ton New York follow:

Heavy melting steel, yard	$13.50 to $14.50
Steel rails, short lengths, or equivalent	15.00 to 16.00
Rails for rolling	18.00 to 19.00
Relaying rails, nominal	25.00 to 26.00
Steel car axles	18.00 to 19.00
Iron car axles	24.00 to 24.50
No. 1 railroad wrought	16.00 tb 17.00
Forge fire	11.50 to 12.50
No. 1 yard wrought, long	15.00 to 16.00
Cast borings (clean)	10.75 to 11.25
Machine-shop turnings	11.25 to 11.75
Mixed borings and turnings	10.00 to 11.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	13.00 to 13.50
Stove plate	13.25 to 14.25
Locomotive grate bars	14.00 to 15.00
Malleable cast (railroad)	16.00 to 17.00
Cast iron car wheels	15.50 to 16.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$20.00 to $21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	19.00 to 20.00
No. 1 heavy cast, not cupola size	15.50 to 16.50
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 18.00

Coke.—Prices are firm and demand for prompt shipment continues fairly active. Consumers are evidently desirous of maintaining good stocks in view of a possible coal strike this spring. Standard foundry is ob-

tainable in spot carloads at $5 to $5.50 per ton and standard furnace at $4 to $4.25 per ton, with medium sulphur about $3.75 per ton. By-product is quoted at $10.91, Newark and Jersey City, N. J.

St. Louis

Pig Iron Sales and Inquiries Increase, with Prices Advanced

ST. LOUIS, Jan. 22.—The pig iron market shows considerable improvement. Sales and inquiries have increased in volume, and prices are higher, Northern iron now being quoted at $24, Chicago, and Southern iron at $22 to $23, Birmingham. The St. Louis Coke & Chemical Co. reports the sale during the week of 3000 tons of foundry iron to a broker for prompt delivery and in addition 500 tons, the latter including one 200-ton order and small lots. One Southern interest sold 3700 tons of foundry grades for second quarter delivery. One Illinois melter wants 600 to 1000 tons of foundry iron for March to June delivery, while there is another inquiry out for 500 tons for second quarter delivery.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$26.16
Northern malleable, sil. 1.75 to 2.25	26.16
Basic	26.16
Southern fdy., sil. 1.75 to 2.25 (rail)	$27.17 to 28.17

Finished Iron and Steel.—The principal new inquiry before the market is for 1,375,000 tie plates for the Wabash Railway, a previous inquiry for 2,500,000 tie plates of the Missouri Pacific still pending. The Wabash also is in the market for its first half requirements in splice bars and track bolts. The Mobile & Ohio wants 500 kegs of standard track spikes. There is some demand for tank plates and ground pipe from the Arkansas and northern Louisiana oil fields. Warehouse business is quiet.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 4.70c.; structural rivets, 4.15c.; boiler rivets, 4.35c.; tank rivets, $\frac{7}{16}$-in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, squares or hexagon blank, $2.50, and tapped, $2.50 off list.

Coke.—Recent exceedingly cold weather in this territory has had the effect of stimulating the demand for domestic and industrial grades, causing a reduction in storage piles. However, these piles are still very high.

Old Material.—The only change in old material prices during the week was in wrought iron bars and transoms, which advanced $1.50 per net ton. Virtually every item brought the maximum quotation. Consumers are buying heavily, about 5000 tons of specialties and miscellaneous rails being sold during the week. Rolling mill grades are showing increased activity.

Per Gross Ton

Iron rails	$18.00 to $18.50
Rails for rolling	19.50 to 20.00
Steel rails, less than 3 ft.	20.00 to 20.50
Relaying rails, 60 lb. and under	25.00 to 26.00
Relaying rails, 70 and over	32.50 to 33.50
Cast iron car wheels	19.50 to 20.00
Heavy melting steel	17.50 to 18.00
Heavy shoveling steel	17.00 to 17.50
Frogs, switches and guards cut apart	18.00 to 18.50
Railroad springs	20.50 to 21.00
Heavy axles and tire turnings	14.00 to 14.50

Per Net Ton

Steel angle bars	16.00 to 16.50
Steel car axles	20.00 to 20.50
Iron car axles	26.50 to 27.00
Wrought iron bars and transoms	22.00 to 22.50
No. 1 railroad wrought	16.50 to 17.00
No. 2 railroad wrought	16.00 to 16.50
Cast iron borings	11.50 to 12.00
No. 1 busheling	15.50 to 16.00
No. 1 railroad cast	19.00 to 19.50
No. 1 machinery cast	19.00 to 19.50
Railroad malleable	17.00 to 17.50
Machine shop turnings	10.50 to 11.00
Champion bundled sheets	10.50 to 11.00

Boston

More Real Interest Shown in Pig Iron and Market Appears Firmer

BOSTON, Jan. 22.—Although hardly enough business in pig iron was closed the past week to really test prices, more bona fide interest in supplies is shown by foundries and the general situation appears firmer. Included in the inquiries is one for 450 tons silicon 2.20 from a Pittsfield, Mass., melter, another for 500 to 1000 tons silicon 2.25 to 2.75 and 2.75 to 3.25 from Connecticut, and 500 tons silicon 2.25 to 2.75 from Providence, R. I., together with numerous smaller tonnages of varying grades of iron. The largest individual order booked the past week was 300 tons No. 2X eastern Pennsylvania from a Massachusetts stove maker. Aggregate sales approximated 2000 to 2500 tons. Resale Buffalo iron at $22 furnace base has cleaned up. Buffalo furnaces heretofore inclined to shade prices on round tonnages are today holding firmly to $23 base. On eastern Pennsylvania iron $22.50 furnace base can be done, but more than 90 per cent of furnaces quoting ask 50c. more, and even more when second quarter iron is involved. Alabama iron has advanced to $22.50 base furnace. Virginia remains $24 to $26 base. French iron business is again actively solicited, 800 to 1000 tons of silicon 2.50 to 3.00 at $23.50 c.i.f. Philadelphia and $23 New York, and 3000 tons silicon 2.75 to 3.25 at $21.50 Philadelphia and $21 New York.

We quote delivered prices on the basis of the latest reported sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$26.65 to $27.15
East. Penn., sil. 1.75 to 2.25	26.15 to 26.65
Buffalo, sil. 2.25 to 2.75	28.41
Buffalo, sil. 1.75 to 2.25	27.91
Virginia, sil. 2.25 to 2.75	30.42 to 32.42
Virginia, sil. 1.75 to 2.25	29.92 to 31.92
Alabama, sil. 2.25 to 2.75	32.60
Alabama, sil. 1.75 to 2.25	32.10

Billets.—Billet sales the past week for reforging purposes involved large tonnages at full market prices. A sale of 1500 tons of billet ends also is reported, all transactions for first quarter delivery.

Finished Material.—Improvement is noted in the demand for finished material, and with it less inclination to shade prices by the smaller producers. The firmer feeling is particularly noticeable in the bar market, 2.40c. Pittsburgh base being more generally quoted than heretofore. Bookings of bars the past fortnight have been highly satisfactory, practically all classes of buyers being represented in sales. Rod specifications by screw manufacturers and others also are heavier, and buying of galvanized and blue annealed sheets as well as tin plate is more active than in months. The Maine Central and Boston & Albany Railroads have closed on their 1924 track material requirements. The Boston & Maine Railroad, Maine Central, Bangor & Aroostook, Central Vermont, Boston Elevated Railway Co., Eastern Massachusetts Street Railway, the Providence, R. I., and Portland, Me., traction companies have specified for 1924 rail and accessory requirements, the aggregate tonnage involved falling 2000 to 3000 behind 1923 purchases. Some good business also has been placed for heavy castings and drop forgings, while several sizable inquiries are in the market for wheels and axles. The bolt and nut market is active, with 60 and 10 per cent discount apparently being maintained as far as the jobbing trade is concerned.

Coke.—The by-product foundry coke situation is practically unchanged. Both the New England Coal & Coke Co. and the Providence Gas Co. continue to quote contract fuel at $12.50 delivered within New England. Specifications against contracts as a precaution against a possible coal strike are reported, but such instances have been few and far between. Most foundries have sufficient foundry coke on hand to carry them through February and some through March unless business improves. The recent price concessions on crushed coke have stimulated sales, one of 4800 tons being closed this week. With crushed coke stock piles diminishing and with Connellsville district prices firmer, the position of the foundry coke market is more secure.

Old Material.—Excited buying of heavy melting steel and mixed borings and turnings by brokers early in the week distorted prices to such a degree it was difficult to determine just what the market for these materials was. There were periods when prices paid for heavy melting steel ranged from $13 to $16 on cars, shipping point. The market today appears to have settled to around $14.50 to $15, which represents a net gain of 50c. for the week. Most recent buying has been for Vandergift, Pa., and eastern Pennsylvania destinations. For 800 tons of mixed borings and turnings $11.25 on cars was paid, while $11.50 was given on part of 1000 tons, in both instances for Weirton, W. Va. Pipe was in excellent demand early in the week, as high as $13 and $14 on cars shipping point being paid. Orders are completed, however, and the market has settled back to $12 to $12.50. Steel turnings and cast iron rolling mill borings have appreciated 25c. to 50c. a ton, with mixed material. Shafting, car wheels and rails for rerolling are firmer, but not active. Machinery cast is easier and dull. The General Electric Co., West Lynn, Mass., sold 31 cars of various materials the past week at high prices. The Watertown Arsenal, Watertown, Mass., will take bids until Jan. 30 on approximately 100 tons heavy steel castings.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$23.00 to $23.50
No. 2 machinery cast	21.00 to 21.50
Stove plates	16.00 to 16.50
Railroad malleable	18.00 to 18.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$14.50 to $15.00
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	12.50 to 13.00
Wrought pipe (1-in. in diam., over 2 ft. long)	12.00 to 12.50
Machine shop turnings	10.50 to 11.00
Cast iron borings, chemical	12.00 to 12.50
Cast iron borings, rolling mill	11.00 to 11.25
Blast furnace borings and turnings	11.00 to 11.25
Forged scrap and bundled skeleton	10.00 to 10.50
Shafting	17.50 to 18.00
Street car axles	17.50 to 18.00
Rails for rolling	15.00 to 15.50

Buffalo

More Inquiry for Pig Iron—Prices Asked for Scrap Are Advancing

BUFFALO, Jan. 21.—The inquiry for pig iron has increased this week over last, and runs to an aggregate of 7000 to 8000 tons for foundry and malleable grades. Sales are probably between 6000 and 7000 tons. One of the inquiries is for 2200 tons of foundry and two others are for 1000 tons of foundry and malleable each. One producer who sold 2000 tons the past week secured a price of $23 for most of its 1.75 to 2.25 silicon foundry and the same price for some foundry lower than 1.75 silicon. This price is hardly representative, as considerable $22.50 selling is being done and there is little doubt that a round tonnage of iron could command $22. One producer who has not taken orders for much iron, comparatively, in November and December, is booking on a $22.50 to $23 basis. Producers say they are obtaining usual differentials on the various silicon grades.

We quote f.o.b., gross ton, Buffalo, as follows:

No. 1 foundry, sil. 2.75 to 3.25	$23.00 to $24.00
No. 2 foundry, sil. 2.25 to 2.75	22.50 to 23.50
No. 2 plain, sil. 1.75 to 2.25	22.00 to 23.00
Basic	22.00
Malleable	22.00
Lake Superior charcoal	29.28

Finished Material.—Mills are exhibiting an increasingly stiffer tendency in prices, and the looked-for weakening appears to be more and more a buyers' chimera. What evidences there were of softened quotations have been obliterated, and in the face of this movement the lines have increased in activity. Bars and shapes show a better feeling, with a very fair demand for carload and less-than-carload lots of bars. Recent bar contracts with a Detroit automobile firm by a local mill are said to have totaled 17,000 tons. Mild weather has been keeping the structural season open later than usual. A Rochester fabricator, the Heughes Construction Co., is said to have taken two jobs in that city approximating 800 tons. One was a boiler house for the University of Rochester; the other was an addition to a building. The Heughes company was low bidder and information here is that it took the contracts. Business in sheets is better. The demand is mostly for black sheets. Most of the automobile companies are covered. Stove companies are interested. The price is firm at 3.85c. Tinplate specifications are on time and in full. Pipe demand is sustained. The Lackawanna-Bethlehem plant has increased open-hearth operation from 10 to 14.

We quote warehouse prices Buffalo as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold rolled round shafting, 4.45c.

Coke.—The market is fairly active, sellers report, with the demand chiefly for furnace at $4 to $4.25, Connellsville. Foundry demand is just moderate at $5 to $6.50, Connellsville.

Old Material.—The local market has responded to the increased activities outside by stiffened prices and a railroad equipment company is reported to have bought 2000 tons of heavy melting steel at $21, Buffalo. Two other companies which had been casting around with a view to acquiring a large tonnage of heavy melting steel have not purchased. Heavy melting steel is commanding $23, Youngstown and Pittsburgh, and hydraulic compressed is being quoted at $20.50 to $21, Youngstown. These prices are interesting here, inasmuch as heavy shipments have been made to Pittsburgh and Valley points. Eastern Pennsylvania also shows signs of opening. Malleable car wheels and all the specialties are in active demand outside, and material is going from here to supply these wants. The impression among dealers here is that heavy melting steel will top the pig iron quotation. It is hardly likely that a good tonnage of steel could be bought here, for lower than $22 to $23, Buffalo. It is almost impossible for dealers to buy scrap for yard purposes, owing to the heavy outside demand. Dealers who have short orders of heavy melting steel are paying $20.50 to $21 to fill.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel	$20.00 to $21.00
Low phos., 0.04 and under	22.50 to 23.00
No. 1 railroad wrought	16.50 to 17.00
Car wheels	20.00 to 20.50
Machine shop turnings	14.00 to 14.50
Cast iron borings	14.50 to 15.00
No. 1 busheling	16.00 to 16.50
Stove plate	18.00 to 18.50
Grate bars	17.50 to 18.00
Bundled sheet stampings	13.00 to 13.50
Hydraulic compressed	16.50 to 17.00
Railroad malleable	20.00 to 21.00
No. 1 machinery cast	20.00 to 20.50

Canadian Scrap Market

TORONTO, ONT., Jan. 21.—Considerable improvement has made its appearance in the iron and steel scrap market since the beginning of the year. Melters who allowed their stocks to become very low during the latter part of 1923 are now entering the market for material and as a result dealers are finding a much stronger demand for scrap. Steel plants are entering the market for heavy melting steel and turnings, and buying on future account is again featuring the market, as well as more activity in the demand for spot material. Foundries are showing interest in their requirements of No. 1 machinery cast and as a result of the increased demand dealers are finding more difficulty in picking up this commodity, and as a result Montreal dealers have advanced their buying price $2 per net ton. Dealers' buying prices are as follows:

	Toronto	Montreal
Gross Tons		
Steel turnings	$10.00	$7.00
Machine shop turnings	10.00	7.00
Wrought pipe	8.00	7.00
Rails	12.00	12.00
No. 1 wrought scrap	12.00	13.00
Heavy melting steel	12.00	11.00
Steel axles	15.00	18.00
Axles, wrought iron	18.00	20.00
Net Tons		
Standard car wheels	15.00	14.00
Malleable scrap	15.00	15.50
Stove plate	15.00	14.00
No. 1 machinery cast	18.00	21.00

Cincinnati

Prices of Pig Iron Advanced—American Rolling Mill Co. Will Not Buy Basic

CINCINNATI, Jan. 22.—The pig iron market last week was featured by an advance of $1 per ton on Southern iron and 50c. on southern Ohio district iron. The improved position of the furnaces with respect to orders booked during the week was not particularly strong. However, it is recognized that melters of iron with increasing business will have to come into the market for further tonnage, for first quarter requirements, and most of the buying of the past week was for March and April shipment. Furnaces in southern Ohio and Alabama have named prices for second quarter, and some of them make no distinction over the first half. On Southern iron, $22 Birmingham can still be done, but it is extremely likely that this price will have disappeared before the week is over. Sales are being made all the way from $22 to $23, with $22.50 for second quarter being quoted by the majority of furnaces. In southern Ohio the market has advanced to $23, with indications of further advances. Sales include one of 700 tons of Northern foundry, one of 600 tons, to Indiana melters, and one of 500 tons to Cincinnati. Several sales of Southern, ranging from 100 to 300 tons, also were made. The American Rolling Mill Co. has decided not to buy basic and will probably light a second Columbus stack. A sale of 600 tons of silvery iron is reported, and reports are current that slightly less than the schedule was done. We note a sale of 300 tons of Bessemer iron to a melter in this territory. Some grades of charcoal have been advanced $1. Inquiry is light, most sales being developed by salesmen calling on the trade.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$26.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	26.55
Ohio silvery, 8 per cent	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	25.27
Basic Northern	24.77
Malleable	25.27

Reinforcing Bars.—Demand is improving. A local fabricator placed an order for 500 tons for first quarter at 2.40c., mill. A number of sizable projects are now being figured, and the number scheduled for erection this spring indicate that reinforcing bars will be in good demand at least through the first half.

Structural Activity.—The L. & N. Railroad has issued an inquiry for 6500 tons for a bridge near New Orleans, on which bids will close Jan. 31. This road will also close bids this week on 2000 tons of bridge work scattered over its system. It has awarded the general contract for a warehouse building at New Orleans to Doullot & Williams of that city, and it is reported that a Louisville fabricator is low on 1400 tons of structural steel involved. Other new inquiries include the Columbia Club, Indianapolis, 900 tons; the Masonic Temple, Portsmouth, Ohio, 800 tons, bids closing Feb. 11, and the Meredith Hotel, Huntington, W. Va., 350 tons, which is being refigured. The American Bridge Co. will redesign and fabricate approximately 2200 tons for the Kentucky Hotel at Louisville, Ky. The American Bridge Co. is reported to have been awarded the assembly plant at Louisville for the Ford Motor Co., involving 1650 tons. U. S. Engineers' Office, Louisville, is taking bids on Dams 45 and 46, involving 1500 tons of sheet piling, and several thousand tons of miscellaneous steel, including forgings, plates, etc. The Howard Shipbuilding Co. is low bidder on a maneuver boat for Memphis, 150 tons.

Sheets.—Orders continued to pour in during the past week, and some mills are reported to be now practically out of the market for first quarter. Automobile body sheets are in big demand, and seconds are beginning to move. Prices are stronger, the regular schedule of 3c. for blue annealed, 3.85c. for black and 5c. for galvanized being rigidly adhered to, and automobile sheets steady at 5.35c.

Warehouse Business.—Jobbers report demand picking up steadily, but it has not reached proportions expected. However, manufacturing in general is steadily improving in this district, and confidence is expressed regarding the outlook. Prices are being firmly maintained.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.25c.; cold-rolled flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, $3.60 per 100 lb.; common wire nails, $3.50 per keg base; cement coated nails, $3.30 per keg.

Finished Materials.—Demand for finished materials is improving steadily, and the month of January, if the present rate of bookings is maintained, will be the best since last spring. While there are no unusually large orders being placed, a greater number of moderate sized orders are being booked, and the aggregate tonnage is entirely satisfactory. A number of large buyers have yet to come into the market for their needs, and as a result the trade is very optimistic regarding the future. Plates and structural shapes are not being ordered heavily, though indications point to a healthy demand developing within the next two weeks, as tank builders are figuring on several large contracts, and a number of sizable building projects are scheduled to come out. There is practical unanimity among mills on price, 2.50c., Pittsburgh, now being the general quotation. An improved demand for bars is reported, and this includes cold-finished as well as hot-rolled. Prices are firm. The demand for wire products is spotty, though there has been a good demand for manufacturers' wires. Nails are moving fairly well, with some Pittsburgh and Southern mills meeting the Ironton rate to this district. In the specialties demand is well maintained, and a slight improvement in bolts and nuts is reported, with prices holding steadily.

Coke.—A slightly improved demand for foundry and domestic grades of coke is reported, but most of the orders are for carload lots for spot shipment. Little contracting is being done. Prices are generally unchanged, and on by-product foundry $8 Connellsville will be the contract price for February. We quote:

Connellsville furnace, $4.00; foundry, $5.00; New River foundry, $10.00 to $11.00; Wise County furnace, $4.75; foundry, $5.75; by-product foundry, $8.00, Connellsville basis.

Old Material.—The scrap market locally is showing a little more life, but most of the activity is from outside points. Prices continue to advance, especially in the steel grades, and for shipment to Pittsburgh it is reported that $23.50 delivered has been done. Reports are current that all heavy melting steel scrap available is held very closely, and much higher prices are expected. Taken in connection with old material dealers' purchases of basic iron, an interesting situation is expected to develop when the steel mills enter the market for basic iron and scrap. The local market for some grades is at least $1 higher, while on others advances of 50c. per ton have been made in buying prices.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$12.50 to $13.00
Iron rails	17.00 to 17.50
Relaying rails, 50 lb. and up	30.50 to 31.00
Rails for rolling	17.50 to 18.00
Heavy melting steel	17.50 to 18.00
Steel rails for melting	16.00 to 16.50
Car Wheels	16.00 to 16.50
Per Net Ton	
No. 1 railroad wrought	13.50 to 14.00
Cast borings	12.00 to 12.50
Steel turnings	11.00 to 11.50
Railroad cast	17.50 to 18.00
No. 1 machinery cast	21.00 to 21.50
Burnt scrap	14.00 to 14.50
Iron axles	24.50
Locomotive tires (smooth inside)	16.50 to 17.00
Pipes and flues	11.00 to 11.50

Net income of the Virginia Iron, Coal & Coke Co. for the fourth quarter of 1923 amounted to $75,372, after interest, taxes, etc., as compared with net for the third quarter of $170,414. In a letter to stockholders President John B. Newton stated that this brings the total net income for 1923 to $604,329.

Birmingham

Pig Iron Market Stronger, Following Large Sale to Cast Iron Pipe Company

BIRMINGHAM, ALA., Jan. 22.—The pig iron market in the Birmingham district has taken on further strength. The largest pipe manufacturing company has purchased a round tonnage of iron and the transaction has had marked effect on the market. Production has been increased by the blowing in of one furnace. The schedule announced last week is still on, and two more furnaces to resume operation during the coming month. Surplus stock of iron has been resorted to for some iron. Quotations are on a firm base of $22 per ton, No. 2 foundry, though two furnace interests have been holding to $22.50 and $23. Inquiries are coming in steadily and the hope is that during the second month of the first quarter a very large part of the probable make of the second quarter will be sold. Resumption on the part of several pipe shops this week throughout the district will bring about further demand for iron on prompt delivery. The larger pipe shops are well supplied with business and must have iron delivered at stated periods.

The Sloss-Sheffield Steel & Iron Co. will next month fortify itself against a very large demand for pig iron from the Middle West, the St. Louis and Chicago territories, by blowing in another furnace on the Tennessee River, at Sheffield, making three stacks producing at that point.

We quote per gross ton f.o.b. Birmingham district furnace as follows:

Foundry, silicon 1.75 to 2.25	$22.00 to $23.00
Basic	22.00 to 23.00
Charcoal, warm blast	33.00

Coke.—No material improvement can be reported in the coke market, despite the fact that there have been statements that slight improvement in conditions with the coke market have taken place. Production is not changed except with one of the iron manufacturing companies, repaired oven of the by-product plant being put back into commission. Bee-hive coke production has not been changed any this year.

Old Material.—Better feeling is noted in the old material market in the Birmingham district, as demand for some of the products is noted. One of the Gadsden foundry and machine shops will build an addition to the plant if further tonnage of window sash weights is offered. The 5000-ton order received from New York State is to be produced during the next 12 months. Stove plate and melting steel will be used in the manufacture of the sash weights, which will range from 3 to 15 lb. each. The first shipment of two cars goes out this week. Pipe shops in general are using some old material. Quotations of scrap remain the same as they have been for the past two weeks, though heavy melting steel is considered too low by dealers. Dealers in old material are keeping their stocks well up.

We quote per gross ton f.o.b. Birmingham district yards, nominal prices, as follows:

Cast iron borings, chemical	$16.00
Heavy melting steel	$13.00 to 14.00
Railroad wrought	12.00 to 13.00
Steel axles	19.00 to 20.00
Iron axles	20.00
Steel rails	12.00 to 13.00
No. 1 cast	19.00 to 20.00
Tram car wheels	18.00 to 19.00
Car wheels	13.00 to 14.00
Stove plate	17.00 to 17.50
Machine shop turnings	6.00
Cast iron borings	8.00

Cast Iron Pipe.—The California territory has been placing tonnages again with the cast iron pipe makers of the Birmingham district, for both gas and water pipe and sanitary pipe. One of the local pipe shops received an order for the past week for 11,000 ft. of small sized pipe to be shipped to the immediate San Francisco territory. The American Cast Iron Pipe Co. announces lettings recently to include the following: 1773 tons for Houston, Tex.; 213 tons for Eau Claire, Wis.; 307 tons for Green Bay, Wis., and 781 tons for Laurinburg, N. C. The National Cast Iron Pipe Co. is selling its make of DeLavaud method pipe steadily and the old style pipe of this company is not being piled on yards. The United States Cast Iron Pipe & Foundry Co. is also participating in the active pipe business. Two of the pipe shops at Gadsden, which have been out of operation since before the turn of the year, are again in operation with a nice order book in hand. Anniston pipe plants are also beginning to pick up speed. We quote:

4-in. water, $51; 6-in., $47; larger sizes, $46; 4-in. gas, $56; 6-in., $52; standard sanitary pipe, $55; heavy gage, $45.

Cleveland

Greater Demand for Shapes and Plates—Pig Iron Prices Advanced

CLEVELAND, Jan. 22.—The volume of new business in finished materials is holding up well, particularly for steel bars, and the demand for structural material and plates has increased. Mills are entering orders considerably in excess of shipments and deliveries, which until recently could be made promptly, are becoming somewhat extended. In the case of steel bars, several mills cannot promise shipments within six weeks. Consumers in the automobile field are crowding the mills for shipments of spring steel. Orders are well scattered among various consuming interests, although the heaviest demand is from the automotive industry. Round lot orders for plates have been placed the last few days by this industry for frames and other parts and some of the smaller plate mills are filled up for several weeks. Plates can still be bought at 2.40c., Pittsburgh, but mills that have been making concessions are more inclined to hold to regular prices and a local mill is no longer quoting below the 2.50c. price. Inquiries include one for 500 tons of 3½ per cent nickel steel bars from an automobile parts manufacturer. A fair volume of business is coming from the agricultural implement industry. Inquiry for structural material for building work continues active, though not much work is developing in this territory. Bids have been taken for 2400 tons of structural material for conservation work in Colorado. The Louisville & Nashville Railroad took bids Monday for 1900 tons for bridge work and will receive bids for 6500 tons additional Jan. 31. New inquiries have come out for at least two more lake boats. The New York Central Railroad has an inquiry out for 100 locomotives.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.60c. to 5.80c.; No. 10 blue annealed sheets, 3.60c. to 4c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, $3.50 per 100 lb.; No. 9 galvanized wire, $3.95 per 100 lb.; common wire nails, $3.60 base per 100 lb.

Pig Iron.—Foundries, particularly those affiliated with the automotive industry, are beginning to show an interest in second quarter iron and several sales for that delivery involving considerable tonnage were made during the week. However, local furnaces and some other producers, owing to uncertainty as to second quarter costs because of the possibility of a coal strike, are declining to quote beyond the first quarter. The market is firm and Cleveland furnaces have made a further price advance of $1 a ton to $24 for No. 2 foundry for local delivery at which they have made several sales and are holding to $23 to $23.50 for out-of-town shipment. Some furnaces taking second quarter business are asking a 50c. advance for that delivery and most of the second quarter sales have been made at $23.50 lake furnace, although an Akron consumer who inquired for 300 tons for the second quarter succeeded in placing the business with a Valley producer at $22.50. The Valley market is firm at that price for the first quarter and some business is being taken at $23. A local automobile foundry is figuring on several thousand tons for the second quarter. No sales of basic iron are reported, but another inquiry has come out from a consumer for 15,000 tons. The inquiry from the Central Steel Co. is for from 5000 to

20,000 tons. Local producers are holding firmly to $22 for basic. Low phosphorus iron has become active. A Valley producer during the week sold several lots aggregating 5000 tons. Southern foundry iron is firm at $22 for the first quarter and $22 to $22.50 for the second quarter, Alabama furnaces holding to the higher price for the more extended delivery. We note the sale of 1500 tons including two 500-ton lots in the Pittsburgh district at $22.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6 rate from Birmingham:

Basic, Valley furnace	$22.00
Northern No. 2 fdy., sil. 1.75 to 2.25	24.50
Southern fdy., sil. 1.75 to 2.25	28.00 to 28.50
Malleable	24.50
Ohio silvery, 8 per cent	35.52
Standard low phos., Valley furnace	29.00 to 30.00

Bolts, Nuts and Rivets.—Specifications on bolts and nuts are coming out in good volume and makers are getting some new business in prompt shipment orders from automobile manufacturers. Prices are firm. New rivet business is very light, but specifications are fair. There is still some irregularity in small rivets. A new price list on cap and set screws will be placed in effect Feb. 1.

Sheets.—The demand continues heavy, particularly from the automotive field. Mills have become comfortably filled for several weeks and prices are firmer than they have been for some time, as several producers have withdrawn all prices below the regular quotations. Low prices have appeared on light plates in competition with blue annealed sheets. While 3c. is the common quotation on plates in blue annealed gages, an Ohio car builder is reported to have placed 1000 tons of No. 10 gage at 2.75c.

Reinforcing Bars.—There is a good demand for small lots. The Bourne-Fuller Co. has taken 100 tons for the West Virginia State Capitol Building. The McArthur Contracting Co., Kenton, Ohio, has taken Ohio highway work requiring 400 tons. Prices are still irregular. Billet steel reinforcing bars are commonly quoted at 2.30c., Pittsburgh, and rail steel bars at 2.10c.

Semi-Finished Steel.—Some inquiry is still coming out, particularly for sheet bars from mills that have not covered for their full first quarter requirements. Slabs are somewhat firmer, although the $40 price has probably not disappeared. This price was shaded on some recent business. Sheet bars are firm at $42.50.

Iron Ore.—Consumption of Lake Superior ore during December was 4,478,842 gross tons, an increase of 27,365 tons over November. Consumption during December, 1922, was 4,478,842 tons. Furnace stocks Jan. 1 amounted to 30,653,619 tons. The amount at furnaces and Lake Erie docks Jan. 1 was 38,635,051 tons as compared with 39,866,049 tons on the same date a year ago.

Coke.—The foundry coke market is very quiet and the prices are unchanged. Standard Connellsville foundry coke is quoted at $4.75 to $6.50 for prompt shipment and $6.25 to $6.50 for contracts.

Old Material.—Price advances have apparently been checked, as the only quotations marked up during the week were on railroad malleable, light bundled stampings and busheling. Buying by mills has fallen off and activity at present is mostly between dealers. While the market generally is very firm, heavy melting steel has eased up somewhat locally owing to the fact that no consumers are in the market. During the week dealers paid $20 for this grade, but they are now offering only $19 for heavy melting steel for Cleveland delivery. The National Tube Co. has made an additional purchase of 3000 tons of heavy melting steel for Lorain at $20.50 and additional purchases of blast furnace borings and turnings have been made by a local mill at $16.50, in these cases the price being the same as paid about ten days ago. Sales of two 500-ton lots of sheet bar crop ends are reported by a Cleveland dealer to Pittsburgh district mill at $24.50 and $25. Dealers in the Youngstown district have paid as high as $22.50 for heavy melting steel.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$19.00 to $19.50
Rails for rolling	19.50 to 20.00
Rails under 3 ft	20.00 to 21.00
Low phosphorus melting	20.75 to 21.00
Cast borings	16.00 to 16.25
Machine shop turnings	15.00 to 15.25
Mixed borings and short turnings	16.00 to 16.25
Compressed sheet steel	17.00 to 17.25
Railroad wrought	17.00 to 17.50
Railroad malleable	21.00 to 21.50
Light bundled sheet stampings	14.25 to 14.50
Steel axle turnings	16.25 to 16.50
No. 1 cast	21.50 to 22.50
No. 1 busheling	15.00 to 15.25
Drop forge flashings	13.75 to 14.25
Railroad grate bars	18.50 to 19.00
Stove plate	18.50 to 19.00
Pipes and flues	15.00 to 15.50

Philadelphia

Steady Gain in Volume of Steel Tonnage and Operations at Eastern Mills Are Increasing

PHILADELPHIA, Jan. 22.—For the first time in many months, orders for some steel products are coming to the mills at a rate exceeding shipments. One independent steel company reports that its sales in the Philadelphia district so far this month are in the aggregate on a par with the best month of 1923, and the surprising feature is that most of the orders are for relatively small tonnages. Some of the Eastern plate mills report sales at least 50 per cent in excess of tonnage taken the first three weeks of December. Operations at all Eastern plants have steadily increased since the first of the month. The Bethlehem Steel Co. is working at a very full rate in all departments except the plate mills. Structural steel is in particularly good demand, and two small structural mills in the East have attained a 60 or 65 per cent operation. The automobile industry is a prominent factor in the demand for bars, sheets and cold-finished steel.

Pig iron is the weak spot in the market. Some offers of foundry iron have been made at $22.50, furnace, for No. 2 plain and No. 2X has been sold at $23, furnace. Inquiries for basic and Bessemer total 13,500 tons. The scrap market continues strong with further price advances.

Ferroalloys.—A discount of one-half of 1 per cent which domestic makers of ferromanganese allow for cash in 10 days has been reported as a concession from the $109 price which has been in effect for some weeks. It is explained that the cash discount is an established custom and the fact that some buyers have taken advantage of it has, it is stated, been incorrectly interpreted as indicating a weakness in price. British ferromanganese is still quoted at $110, seaboard.

Pig Iron.—Some eastern Pennsylvania furnaces have tried to stimulate pig iron buying by price concessions of at least 50c. a ton. No. 2X iron has been sold at $23, furnace, whereas $23.50 has recently been the usual quotation. No. 2 plain is offered at $22.50, furnace, and it is quite likely that some business has already been taken on this basis. Inquiries for steel-making and foundry grades have been more numerous and have totaled larger tonnages in the past week than in any week since early December. One foundry purchase of 3000 tons was divided between two furnaces; 2000 tons of gray forge was sold to a skelp maker at about $22.75, delivered; 2000 tons of foundry and 1000 tons of malleable are being inquired for by a Bridgeport, Conn., melter; a Nicetown plant is inquiring for 5000 tons of basic and 5000 tons of Bessemer or any part thereof, while a New England steel company has asked for prices on 3500 tons of basic. A large New England company recently divided 8000 tons of foundry iron among four furnaces. A number of inquiries for foundry iron in lots ranging from a carload up to 500 tons are in the market. Prices lack the strength which this increase in demand might seem to warrant. In basic as well as in foundry grades

there is a willingness on the part of some furnaces to make concessions for substantial tonnages. Quotations on pending basic business indicate that orders will be placed at not to exceed $22.75, delivered.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$23.63 to $24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.13 to 24.63
East. Pa. No. 1X	24.63 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivery eastern Pa.	22.75 to 23.25
Gray forge	22.75 to 23.00
Malleable	24.25 to 24.50
Standard low phos. (f.o.b. furnace)	27.00 to 27.50
Copper bearing low phos. (f.o.b. furnace)	28.00

Semi-Finished Steel.—There has been increased selling of billets, slabs and sheet bars in the past week. With one or two exceptions the amounts have not exceeded a few hundred tons, and prices have held firmly at $40, Pittsburgh, for rerolling billets and slabs and at $45 for forging billets, with $42.50 being paid for sheet bars.

Plates.—The Pennsylvania Railroad has continued the releasing of orders for plates and these rollings have helped out several of the Eastern mills. Orders for plates so far this month are probably 50 per cent in excess of the bookings in the first three weeks of December. The actual gain in tonnage is not large, as December was a poor month, but encouragement is derived from the fact that an upward trend is slowly developing. Lukens steel was specified for 57 locomotives purchased by the Santa Fe from Baldwin Locomotive Works and the plate order totals about 2300 tons. While most of the current plate business is being taken at 2.40c., Pittsburgh, occasional lots are being sold at 2.35c. Consumers are covering only for the most immediate needs.

Structural Material.—Increasing demand for structural shapes is reflected in a higher rate of operation at Eastern shape mills. The Bethlehem Steel Co. in particular has booked a substantial tonnage of structural material, but some of the smaller mills have also fared pretty well. Jobbers have been placing stock orders. The New York Shipbuilding Corporation is reported to be low bidder on the motor repair station for the City of New York, requiring 10,000 tons. Current prices on plain material range from 2.35c. to 2.50c., Pittsburgh, and an increasing volume is being placed at the top figure.

Bars.—The demand for forging bars from companies making automobile drop forgings continues fairly good. In general the demand for merchant steel is increasing steadily, orders coming from all classes of buyers. The 2.40c. price is firm, the only deviation being on concrete reinforcing bars, occasionally sold at a concession of $1 or $2 a ton, especially rerolled bars. Bar iron remains at 2.30c., Pittsburgh, from Eastern mills. Structural rivets are firm at 2.90c., large spikes at 3c., small spikes at 3.25c. and track bolts at 4c., base, Pittsburgh.

Sheets.—While it is probably true that concessions from the so-called regular sheet prices have not entirely disappeared, the market appears to be firmer at 3c. for blue annealed, 3.85c. for black and 5c. for galvanized. Users of blue annealed sheets in this territory have not bought as freely this month as was expected.

Warehouse Business.—Orders for steel out of stock continue in good volume and jobbers are following a policy of frequent replacements of stock in small lots. Prices are unchanged and for local delivery are as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ⅜ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅛-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—The continued rise in prices of old material is in a sense bewildering to some consumers, who apparently had not expected the market to show such strength as it now displays. Despite the lack of large buying by Eastern mills and foundries, prices for this territory have naturally been affected by the marked activity and high prices in the Pittsburgh-Youngstown district. Heavy melting steel has reached $19, delivered, on one sale, and there were indications today that $20 will have been paid before this issue of THE IRON AGE reaches its readers. Speculative buying on the part of some dealers resulted in over-shipments to one large Eastern plant, with the result that it reduced its price, 50c. a ton and sales were made at less than dealers had paid for the material, for to move it elsewhere would have entailed an even greater loss. Prices on nearly all grades have moved up during the week, some advances being $1 a ton.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$19.00 to $20.00
Scrap rails	19.00 to 20.00
Steel rails for rolling	20.00 to 21.00
No. 1 low phos., heavy 0.04 and under	24.00 to 25.00
Couplers and knuckles	23.00 to 24.00
Cast-iron car wheels	21.00 to 22.00
Rolled steel wheels	23.00 to 24.00
No. 1 railroad wrought	22.00 to 23.00
No. 1 yard wrought	21.00 to 21.50
No. 1 forge fire	16.00 to 16.50
Bundled sheets (for steel works)	16.00 to 16.50
Mixed borings and turnings (for blast furnace use)	13.00 to 13.50
Machine shop turnings (for steel works use)	16.00 to 16.50
Machine shop turnings (for rolling mill use)	16.00 to 16.50
Heavy axle turnings (or equivalent)	17.00 to 18.00
Cast borings (for steel works and rolling mills)	15.50 to 16.00
Cast borings (for chemical plants)	18.00 to 18.50
No. 1 cast	21.00 to 22.00
Heavy breakable cast (for steel plants)	18.50 to 19.00
Railroad grate bars	17.00 to 18.00
Stove plate (for steel plant use)	17.00 to 18.00
Railroad malleable	18.50 to 19.00
Wrought iron and soft steel pipes and tubes (new specifications)	18.00 to 18.50
Shafting	25.00 to 26.00
Steel axles	24.00 to 25.00

December Sheet Orders More Than Double Those of November

Sheet sales as reported by members of the National Association of Sheet and Tin Plate Manufacturers in December were more than double those of the month before, and as production and shipments reflected the disinclination of consumers to order out material with the approach of inventory time, the mills reporting started this year with unfilled orders only slightly more than 60,000 tons less than a year ago. Figures in net tons for December compare with those of November and December, 1922, as follows:

	1923		1922
	December	November	December
Capacity	378,000	407,000	384,000
Per cent reporting	69.8	69.0	66.5
Sales	349,446	165,491	399,624
Production	155,229	188,144	205,239
Shipments	188,600	199,836	216,266
Unfilled tonnage	445,167	280,013	505,766
Unshipped tonnage	59,916	66,624	92,500
Unsold stocks	44,146	45,501	27,500

Furnace Sold for Scrap

The Shenango Furnace Co. has sold its No. 4 furnace at Sharpsville, Pa., for scrap to Henry Potts & Co., Philadelphia, and work of dismantling the furnace, which was begun several weeks ago and then held up, is again in progress.

The statement published in THE IRON AGE of Jan. 17 that the Union Drawn Steel Co., Beaver Falls, Pa., had plans for the construction of a new warehouse in Cleveland was incorrect. The company states that it is not contemplating the construction of a warehouse in Cleveland.

Basic Pig Iron Advances in the Mahoning Valley

YOUNGSTOWN, Jan. 22.—Basic iron has advanced to $22 in the Mahoning Valley. Steel makers are now largely using their basic iron production in their steelmaking departments, leaving little such output for the merchant market. In view of this situation, unsatisfied needs will have to be supplied chiefly from the merchant stacks. The idle merchant furnaces, however, are not likely to come into blast until prices reach a point where they can operate profitably. Further increase in the price of basic iron is therefore forecast.

The marked increase the past few weeks in open-hearth operations accounts for the fact that steel makers with their own blast furnaces have largely withdrawn for the time being from the merchant market, though a number, such as the Sheet & Tube company, are working on contracts calling for deliveries throughout the first quarter. Merchant iron makers look for basic to advance to $24 or $25 and, where their furnaces are now inactive, declare that resumption at present costs would hardly be justified unless such prices could be obtained.

It appears likely therefore that immediate iron requirements will have to be filled at prices somewhat higher than those recently prevailing, especially if the merchant interests are to be persuaded to relight their furnaces.

Coke Market More Active

UNIONTOWN, PA., Jan. 21.—The past week in the Connellsville coke region has been marked by a number of contracts for coke and an unusual amount of inquiries for coal contracts for the remainder of the first quarter. One contract of 5000 tons per month for coke for the remainder of the quarter has been made at a figure around $4.50, the price not being disclosed. Another contract for 10,000 tons a month for the remainder of the quarter also is reported at about that figure. Coke quotations range from $4.10 to $4.50 for furnace and $1 higher for foundry. An increase of 207 in the active furnace ovens is reported during the week. The Frick Coke Co. is reported putting in additional ovens for the ensuing week and is operating on a six-day basis.

Total coke production for the week ending Jan. 12 was 192,420 tons, bringing the total for the first fortnight of 1924 up to 378,860 tons.

Increased Activity of Canadian Mills Follows Rail Order

TORONTO, Jan. 21.—The placing of contracts for steel rails has had a stimulating effect on the Canadian iron and steel market. Mills at Sault Ste. Marie, Ont., and Sydney, N. S., which have been down for three or four months, are starting. The Algoma Steel Corporation, Sault Ste. Marie, Ont., has resumed operations in its rail mill, which has been closed since last September, and is rolling 100-lb. rails for the Canadian National Railways for its Eastern lines. The company has also started up No. 1 open hearth and No. 2 will commence operations within the next few days. It is also the intention of the company to open other departments without delay, and it is stated that some 2200 men will shortly be employed at the works. The British Empire Steel Corporation, Sydney, N. S., will start rolling immediately on a rail order calling for 56,000 tons for the Canadian National Railways for delivery in March. In addition to the business already placed the Canadian railways are considering the placing of other rail orders, also orders for fastenings, etc., which will have a still further stimulating effect on the industrial activities of this country. Orders for cars and locomotives are pending and concerns handling this class of business report that there is already enough business in sight to assure capacity operations for the next six months, at least. The erection of new buildings in which large tonnages of structural steel and reinforcing bars will be required continues at a lively rate, and in addition to these there is a very large volume of construction in prospect, both as regards industrial plants, office and factory buildings, electric development plants, bridges and many other classes of construction work which assure fabricators of structural steel a strong demand for their products throughout the greater part of the present year.

Decreased Demand for Pig Iron in Canada

TORONTO, ONT., Jan. 21.—Following the closing of contracts for first quarter by a large number of melters in Ontario and Quebec, the demand for pig iron in the Canadian market has fallen off considerably and at the present time only a small amount of business is reported by Canadian blast furnace representatives. Practically the entire buying for the past week or two has been confined to tonnages ranging from one to two cars for spot delivery this business coming almost entirely from melters who did not grasp the opportunity to place contracts when prices were at the low ebb during the last week of November. During the latter part of December the production of pig iron took a considerable drop when the Canadian Furnace Co., Port Colborne, Ont., blew out its furnace. This company is now making deliveries of foundry and malleable iron from stock, large tonnages of which were piled before the furnace was blown out. During the past week the blowing in of No. 3 blast furnace was reported by the Algoma Steel Corporation, Sault Ste. Marie, Ont., which in addition to No. 2, which was kept running, leaves the corporation with two furnaces blowing, and the company is now relining No. 4 blast furnace with the intention of blowing it in about the middle of February. The British Empire Steel Corporation, Sydney, N. S., has three furnaces blowing, and the Steel Co. of Canada, Hamilton, Ont., two, making seven furnaces in blast out of a total of 20 in the Dominion. Pig iron prices are holding at the level announced during the first week of December last, and are as follows: No. 1 (2.25 to 2.75 silicon), $29.15; malleable, $29.15; No. 2 (1.75 to 2.25 silicon), $28.15, Toronto. Montreal prices are No. 1 and malleable, $31.55; No. 2, $30.55; Summerlee and Carron, $30 to $32 per ton.

Valley Scrap Market

YOUNGSTOWN, Jan. 22.—Heavy melting scrap has advanced from a low of $16.50 per ton a number of weeks ago to $22, at which price approximately 25,000 tons are reported to have been purchased lately by Valley steel makers. For a short time scrap sold above the basic iron price, a condition which has seldom occurred and reflects the heavy demand at the time for the material.

Scrap dealers have been active buyers, as well as consuming interests. During the lull in steel buying the latter part of 1923, steel producers allowed their scrap stocks to run low. Accordingly when they did come into the market, it was necessary to buy more than usual to restore their scrap stocks.

Plant enlargements by the Youngstown Boiler & Tank Co., Youngstown, have increased its floor space about one-third and enlarged its capacity. Recent additions include two new factory buildings, one 30 x 200 ft. and the other 40 x 400 ft. The company has received a number of substantial orders for storage tanks for the Southwestern oil fields, particularly the Corsicana field. The plant enlargement is in expectation of increased business in 1924.

Oil engine efficiency is to be discussed at a meeting of the Buffalo branch of the American Society of Mechanical Engineers with the Society of Automotive Engineers at the Hotel Statler, Buffalo, Feb. 4. Lawrence Pomeroy, consulting engineer of the Aluminum Co. of America, is the speaker.

there is a willingness on the part of some furnaces to make concessions for substantial tonnages. Quotations on pending basic business indicate that orders will be placed at not to exceed $22.75, delivered.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$23.63 to $24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.13 to 24.63
East. Pa. No. 1X	24.63 to 25.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 30.67
Basic delivery eastern Pa.	22.75 to 23.25
Gray forge	22.75 to 23.00
Malleable	24.25 to 24.50
Standard low phos. (f.o.b. furnace)	27.00 to 27.50
Copper bearing low phos. (f.o.b. furnace)	28.00

Semi-Finished Steel.—There has been increased selling of billets, slabs and sheet bars in the past week. With one or two exceptions the amounts have not exceeded a few hundred tons, and prices have held firmly at $40, Pittsburgh, for rerolling billets and slabs and at $45 for forging billets, with $42.50 being paid for sheet bars.

Plates.—The Pennsylvania Railroad has continued the releasing of orders for plates and these rollings have helped out several of the Eastern mills. Orders for plates so far this month are probably 50 per cent in excess of the bookings in the first three weeks of December. The actual gain in tonnage is not large, as December was a poor month, but encouragement is derived from the fact that an upward trend is slowly developing. Lukens steel was specified for 57 locomotives purchased by the Santa Fe from Baldwin Locomotive Works and the plate order totals about 2300 tons. While most of the current plate business is being taken at 2.40c., Pittsburgh, occasional lots are being sold at 2.35c. Consumers are covering only for the most immediate needs.

Structural Material.—Increasing demand for structural shapes is reflected in a higher rate of operation at Eastern shape mills. The Bethlehem Steel Co. in particular has booked a substantial tonnage of structural material, but some of the smaller mills have also fared pretty well. Jobbers have been placing stock orders. The New York Shipbuilding Corporation is reported to be low bidder on the motor repair station for the City of New York, requiring 10,000 tons. Current prices on plain material range from 2.35c. to 2.50c., Pittsburgh, and an increasing volume is being placed at the top figure.

Bars.—The demand for forging bars from companies making automobile drop forgings continues fairly good. In general the demand for merchant steel is increasing steadily, orders coming from all classes of buyers. The 2.40c. price is firm, the only deviation being on concrete reinforcing bars, occasionally sold at a concession of $1 or $2 a ton, especially rerolled bars. Bar iron remains at 2.30c., Pittsburgh, from Eastern mills. Structural rivets are firm at 2.90c., large spikes at 3c., small spikes at 3.25c. and track bolts at 4c., base, Pittsburgh.

Sheets.—While it is probably true that concessions from the so-called regular sheet prices have not entirely disappeared, the market appears to be firmer at 3c. for blue annealed, 3.85c. for black and 5c. for galvanized. Users of blue annealed sheets in this territory have not bought as freely this month as was expected.

Warehouse Business.—Orders for steel out of stock continue in good volume and jobbers are following a policy of frequent replacements of stock in small lots. Prices are unchanged and for local delivery are as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ¼ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ⅜ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ⅜-in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

Old Material.—The continued rise in prices of old material is in a sense bewildering to some consumers, who apparently had not expected the market to show such strength as it now displays. Despite the lack of large buying by Eastern mills and foundries, prices for this territory have naturally been affected by the marked activity and high prices in the Pittsburgh-Youngstown district. Heavy melting steel has reached $19, delivered, on one sale, and there were indications today that $20 will have been paid before this issue of THE IRON AGE reaches its readers. Speculative buying on the part of some dealers resulted in over-shipments to one large Eastern plant, with the result that it reduced its price, 50c. a ton and sales were made at less than dealers had paid for the material, for to move it elsewhere would have entailed an even greater loss. Prices on nearly all grades have moved up during the week, some advances being $1 a ton.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$19.00 to $20.00
Scrap rails	19.00 to 20.00
Steel rails for rolling	20.00 to 21.00
No. 1 low phos., heavy 0.04 and under	24.00 to 25.00
Couplers and knuckles	23.00 to 24.00
Cast-iron car wheels	21.00 to 22.00
Rolled steel wheels	23.00 to 24.00
No. 1 railroad wrought	22.00 to 23.00
No. 1 yard wrought	21.00 to 21.50
No. 1 forge fire	16.00 to 16.50
Bundled sheets (for steel works)	16.00 to 16.50
Mixed borings and turnings (for blast furnace use)	13.00 to 13.50
Machine shop turnings (for steel works use)	16.00 to 16.50
Machine shop turnings (for rolling mill use)	16.00 to 16.50
Heavy axle turnings (or equivalent)	17.00 to 18.00
Cast borings (for steel works and rolling mills)	15.50 to 16.00
Cast borings (for chemical plants)	18.00 to 18.50
No. 1 cast	21.00 to 22.00
Heavy breakable cast (for steel plants)	18.50 to 19.00
Railroad grate bars	17.00 to 18.00
Stove plate (for steel plant use)	17.00 to 18.00
Railroad malleable	18.50 to 19.00
Wrought iron and soft steel pipes and tubes (new specifications)	18.00 to 18.50
Shafting	25.00 to 26.00
Steel axles	24.00 to 25.00

December Sheet Orders More Than Double Those of November

Sheet sales as reported by members of the National Association of Sheet and Tin Plate Manufacturers in December were more than double those of the month before, and as production and shipments reflected the disinclination of consumers to order out material with the approach of inventory time, the mills reporting started this year with unfilled orders only slightly more than 60,000 tons less than a year ago. Figures in net tons for December compare with those of November and December, 1922, as follows:

	1923		1922
	December	November	December
Capacity	378,000	407,000	384,000
Per cent reporting	69.8	69.0	66.5
Sales	349,446	165,491	399,624
Production	155,229	188,144	205,239
Shipments	188,600	199,836	216,266
Unfilled tonnage	445,167	280,013	505,766
Unshipped tonnage	59,916	66,624	92,500
Unsold stocks	44,146	45,501	27,500

Furnace Sold for Scrap

The Shenango Furnace Co. has sold its No. 4 furnace at Sharpsville, Pa., for scrap to Henry Potts & Co., Philadelphia, and work of dismantling the furnace, which was begun several weeks ago and then held up, is again in progress.

The statement published in THE IRON AGE of Jan. 17 that the Union Drawn Steel Co., Beaver Falls, Pa., had plans for the construction of a new warehouse in Cleveland was incorrect. The company states that it is not contemplating the construction of a warehouse in Cleveland.

Basic Pig Iron Advances in the Mahoning Valley

YOUNGSTOWN, Jan. 22.—Basic iron has advanced to $22 in the Mahoning Valley. Steel makers are now largely using their basic iron production in their steelmaking departments, leaving little such output for the merchant market. In view of this situation, unsatisfied needs will have to be supplied chiefly from the merchant stacks. The idle merchant furnaces, however, are not likely to come into blast until prices reach a point where they can operate profitably. Further increase in the price of basic iron is therefore forecast.

The marked increase the past few weeks in open-hearth operations accounts for the fact that steel makers with their own blast furnaces have largely withdrawn for the time being from the merchant market, though a number, such as the Sheet & Tube company, are working on contracts calling for deliveries throughout the first quarter. Merchant iron makers look for basic to advance to $24 or $25 and, where their furnaces are now inactive, declare that resumption at present costs would hardly be justified unless such prices could be obtained.

It appears likely therefore that immediate iron requirements will have to be filled at prices somewhat higher than those recently prevailing, especially if the merchant interests are to be persuaded to relight their furnaces.

Coke Market More Active

UNIONTOWN, PA., Jan. 21.—The past week in the Connellsville coke region has been marked by a number of contracts for coke and an unusual amount of inquiries for coal contracts for the remainder of the first quarter. One contract of 5000 tons per month for coke for the remainder of the quarter has been made at a figure around $4.50, the price not being disclosed. Another contract for 10,000 tons a month for the remainder of the quarter also is reported at about that figure. Coke quotations range from $4.10 to $4.50 for furnace and $1 higher for foundry. An increase of 207 in the active furnace ovens is reported during the week. The Frick Coke Co. is reported putting in additional ovens for the ensuing week and is operating on a six-day basis.

Total coke production for the week ending Jan. 12 was 192,420 tons, bringing the total for the first fortnight of 1924 up to 378,860 tons.

Increased Activity of Canadian Mills Follows Rail Order

TORONTO, Jan. 21.—The placing of contracts for steel rails has had a stimulating effect on the Canadian iron and steel market. Mills at Sault Ste. Marie, Ont., and Sydney, N. S., which have been down for three or four months, are starting. The Algoma Steel Corporation, Sault Ste. Marie, Ont., has resumed operations in its rail mill, which has been closed since last September, and is rolling 100-lb. rails for the Canadian National Railways for its Eastern lines. The company has also started up No. 1 open hearth and No. 2 will commence operations within the next few days. It is also the intention of the company to open other departments without delay, and it is stated that some 2200 men will shortly be employed at the works. The British Empire Steel Corporation, Sydney, N. S., will start rolling immediately on a rail order calling for 56,000 tons for the Canadian National Railways for delivery in March. In addition to the business already placed the Canadian railways are considering the placing of other rail orders, also orders for fastenings, etc., which will have a still further stimulating effect on the industrial activities of this country. Orders for cars and locomotives are pending and concerns handling this class of business report that there is already enough business in sight to assure capacity operations for the next six months, at least. The erection of new buildings in which large tonnages of structural steel and reinforcing bars will be required continues at a lively rate, and in addition to these there is a very large volume of construction in prospect, both as regards industrial plants, office and factory buildings, electric development plants, bridges and many other classes of construction work which assure fabricators of structural steel a strong demand for their products throughout the greater part of the present year.

Decreased Demand for Pig Iron in Canada

TORONTO, ONT., Jan. 21.—Following the closing of contracts for first quarter by a large number of melters in Ontario and Quebec, the demand for pig iron in the Canadian market has fallen off considerably and at the present time only a small amount of business is reported by Canadian blast furnace representatives. Practically the entire buying for the past week or two has been confined to tonnages ranging from one to two cars for spot delivery this business coming almost entirely from melters who did not grasp the opportunity to place contracts when prices were at the low ebb during the last week of November. During the latter part of December the production of pig iron took a considerable drop when the Canadian Furnace Co., Port Colborne, Ont., blew out its furnace. This company is now making deliveries of foundry and malleable iron from stock, large tonnages of which were piled before the furnace was blown out. During the past week the blowing in of No. 3 blast furnace was reported by the Algoma Steel Corporation, Sault Ste. Marie, Ont., which in addition to No. 2, which was kept running, leaves the corporation with two furnaces blowing, and the company is now relining No. 4 blast furnace with the intention of blowing it in about the middle of February. The British Empire Steel Corporation, Sydney, N. S., has three furnaces blowing, and the Steel Co. of Canada, Hamilton, Ont., two, making seven furnaces in blast out of a total of 20 in the Dominion. Pig iron prices are holding at the level announced during the first week of December last, and are as follows: No. 1 (2.25 to 2.75 silicon), $29.15; malleable, $29.15; No. 2 (1.75 to 2.25 silicon), $28.15, Toronto. Montreal prices are No. 1 and malleable, $31.55; No. 2, $30.55; Summerlee and Carron, $30 to $32 per ton.

Valley Scrap Market

YOUNGSTOWN, Jan. 22.—Heavy melting scrap has advanced from a low of $16.50 per ton a number of weeks ago to $22, at which price approximately 25,000 tons are reported to have been purchased lately by Valley steel makers. For a short time scrap sold above the basic iron price, a condition which has seldom occurred and reflects the heavy demand at the time for the material.

Scrap dealers have been active buyers, as well as consuming interests. During the lull in steel buying the latter part of 1923, steel producers allowed their scrap stocks to run low. Accordingly when they did come into the market, it was necessary to buy more than usual to restore their scrap stocks.

Plant enlargements by the Youngstown Boiler & Tank Co., Youngstown, have increased its floor space about one-third and enlarged its capacity. Recent additions include two new factory buildings, one 30 x 200 ft. and the other 40 x 400 ft. The company has received a number of substantial orders for storage tanks for the Southwestern oil fields, particularly the Corsicana field. The plant enlargement is in expectation of increased business in 1924.

Oil engine efficiency is to be discussed at a meeting of the Buffalo branch of the American Society of Mechanical Engineers with the Society of Automotive Engineers at the Hotel Statler, Buffalo, Feb. 4. Lawrence Pomeroy, consulting engineer of the Aluminum Co. of America, is the speaker.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb.....2.50c.

Structural Materials

Beams, channels, etc., base, per lb.....2.50c.
Sheet piling .....2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.
Soft steel bars for cold finishing.....$3 per ton over base
Reinforcing steel bars, base.....2.40c.
Refined iron bars, base, per lb.....3.10c. to 3.15c.
Double refined iron bars, base, per lb.....4.75c.
Stay bolt iron bars, base, per lb.....7.75c. to 8c.

Hot-Rolled Flats

Hoops, base, per lb.....3c.
Bands, base, per lb.....3c.
Strips, base, per lb.....3c.

Cold-Finished Steel

Bars and shafting, base, per lb.....3c.
Bars, S. A. E. Series, No. 2100.....4.75c.
Bars, S. A. E. Series, No. 2300.....6.25c. to 6.50c.
Bars, S. A. E. Series, No. 3100.....5.25c. to 5.50c.
Strips, base, per lb.....5.00c.

Wire Products

Nails, base, per keg.....$3.00
Galvanized nails, 1 in. and over.....$2.25 over base
Galvanized nails, less than 1 in..... 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb.....$2.75
Annealed fence wire, base, per 100 lb..... 2.90
Spring wire, base, per 100 lb..... 3.70
Glavanized wire No. 9, base, per 100 lb..... 3.35
Galvanized barbed, base, per 100..... 3.80
Galvanized staples, base, per keg..... 3.80
Painted barbed wire, base, per 100 lb..... 3.45
Polished staples, base, per keg..... 3.45
Cement coated nails, base, per count keg..... 2.70
Bale ties, carloads to jobbers.....75 and 2½ per cent off list
Woven fence, carloads (to jobbers).....67½ per cent off list
Woven fence, carloads (to retailers).....65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 per cent off list
Machine bolts, all sizes, cut threads..60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads.60 and 10 per cent off list
Carriage bolts, cut threads, all sizes.....60 per cent off list
Lag bolts .....65 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.,
50 and 10 per cent off list
Larger and longer sizes.....50 and 10 per cent off list
Hot pressed square or hex. nuts, blank.....4.50c. off list
Hot pressed nuts, tapped.....4.50c. off list
C.p.c. and t. square or hex. nuts, blank.....4c. off list
C.p.c. and t. square or hex. nuts, tapped.....4c. off list
Semi-finished hex. nuts:
⅞ in. and smaller, U. S. S.....80 and 5 per cent off list
⅞ in. and larger, U. S. S.....75 and 5 per cent off list
Small sizes, S. A. E.....80, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75, 10 and 5 per cent off list
Stove bolts in packages.....75, 10 and 5 per cent off list
Stove bolts in bulk.....75, 10, 5 and 2½ per cent off list
Tire bolts .....60 and 10 per cent off list
Bolt ends with hot pressed nuts.....60 and 5 per cent off list
Turnbuckles, with ends, ½ in. and smaller,
50 to 55 and 5 per cent off list
Turnbuckles, without ends, ½ in. and smaller,
65 and 5 to 70 and 10 per cent off list
Washers .....5c. to 5.25c. off list

Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

	Per 1000 S. A. E.	Per 1000 U. S. S.		Per 1000 S. A. E.	Per 1000 U. S. S.
¼-in.	$4.80	$4.80	⅞-in.	$15.00	$15.00
⅜-in.	5.50	6.00	1-in.	19.50	20.00
½-in.	6.50	7.00	1⅛-in.	28.50	28.50
⅝-in.	9.00	9.50	1¼-in.	37.00	37.50
¾-in.	11.00	11.50	1⅜-in.	58.50	60.50

Larger sizes—Prices on application.

Cap and Set Screws

Milled square and hex. head cap screws.....70 per cent off list
Milled set screws.....70 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws .....75 and 10 per cent off list
Milled studs .....50 and 10 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$2.90
Small rivets .....65, 10 and 5 to 70 and 5 off list

Track Equipment

Spikes, ⅜ in. and larger, base, per 100 lb.....$3.05 to $3.15
Spikes, ½ in., ⅝ in. and ¾ in., per 100 lb..... 3.25 to 3.50
Spikes, ⅞ in..... 3.25 to 3.50
Spikes, boat and barge, base, per 100 lb..... 3.25 to 3.50
Track bolts, ¾ in. and larger, base, per 100 lb.. 4.00 to 4.25
Track bolts ½ in. and ⅝ in., base, per 100 lb.. 5.00 to 5.50
Tie plates, per 100 lb..... 2.55 to 2.60
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Steel Inches	Black	Galv	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+19	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent on galvanized.

Boiler Tubes

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes
Cold Drawn

1 in.	55	3 and 3¼ in.	36
1¼ and 1½ in.	47	3½ and 3¾ in.	37
1¾ in.	31	4 in.	41
2 and 2¼ in.	22	4½ in. and 5 in.	33
2½ and 2¾ in.	32		

Hot Rolled

3 and 3¼ in.	38	4 in.	43
3½ in. and 3¾ in.	39		

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be hold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list
Carbon 0.30 to 0.40, base.....81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

	Cents per Ft.		Cents per Ft.
2-in. O.D. 12 gage	15	2¼-in. O.D. 10 gage	20
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1½-in. O.D. 9 gage	15
2⅛-in. O.D. 12 gage	17	5⅜-in. O.D. 9 gage	55
2¼-in. O.D. 11 gage	18	5½-in. O.D. 9 gage	57

Tin Plate

Standard cokes, per base box.....$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb base	$11.00	20-lb. coating I. C.	$14.90
8-lb. coating I. C.	11.30	25-lb. coating I. C.	16.20
12-lb. coating I. C.	12.70	30-lb. coating I. C.	17.35
15-lb. coating I. C.	13.95	35-lb. coating I. C.	18.35
		40-lb. coating I. C.	19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....3c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

Galvanized

No. 28 (base), per lb.....5c.

Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron	$6.45
Old range non-Bessemer, 51½ per cent iron	5.70
Mesabi Bessemer, 55 per cent iron	6.20
Mesabi non-Bessemer, 51½ per cent iron	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	11.00c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal	41c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus	38c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates	$8.25 to $10.00
Chrome ore, basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$109.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid	$109.00 to 110.00
Ferrosilicon, 50 per cent, delivered	74.00 to 75.00
Ferrotungsten, per lb. contained metal	85c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered	10.75c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.	10.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent.....$38.00 to $39.00
Spiegeleisen, domestic, 16 to 19 per cent..... 37.00 to 38.00
Ferrosilicon, Bessemer, 10 per cent, $41.50; 11 per cent, $44; 12 per cent, $46.50.
Silvery iron, 6 per cent, $30.00; 7 per cent, $31.00; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39.00; 12 per cent, $41.50.

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines.....$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines 23.50
Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$42.00 to $45.00	$37.00 to $42.00
Maryland	47.00	42.00
Ohio	42.00 to 43.00	37.00 to 39.00
Kentucky	42.00 to 43.00	37.00 to 39.00
Illinois	——	37.00 to 42.00
Missouri	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton		6.00 to 7.00
Silica Brick:		
Pennsylvania		42.00
Chicago		49.00
Birmingham		50.00
Ground silica clay, per net ton		8.00
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain mangnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		48.00

Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$40.00
Rolling billets, 2-in. and under	40.00
Forging billets, ordinary carbons	45.00
Sheet bars, Bessemer	42.50
Sheet bars, open-hearth	42.50
Slabs	40.00
Wire rods, common soft, base, No. 5 to ⅜-in.	51.00
Wire rods, common soft, coarser than ⅜-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon, 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	2.35c.
Skelp, sheared, per lb.	2.35c.
Skelp, universal, per lb.	2.35c.

Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton	$43.00
Rails light, new steel, base, lb.	2.25c.
Rails, light, rerolled, base, per lb.	1.85c. to 2.00c.
Spikes, ⅝-in. and larger, base, per 100 lb.	$3.00 to $3.15
Spikes, ½-in. and smaller, base, per 100 lb.	3.15 to 3.50
Spikes, boat and barge, base, per 100 lb.	3.25 to 3.50
Track bolts, ⅝-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.50 to 5.00
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, per 100 lb.	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill	2.40c.
Bars, rails, steel reinforcing, base, per lb.	2.15c. to 2.25c.
Cold finished steel bars, base, Chicago per lb.	3c.
Ground shafting, base, per lb.	3.40c.
Cut nails, base, per keg	$3.15 to $3.25

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100*(½% Nickel, 10 to 20 per cent Carbon)	$3.50
2300 (3½% Nickel)	$5.00 to 5.25
2500 (5% Nickel)	7.75 to 8.00
3100 (Nickel Chromium)	4.00 to 4.25
3200 (Nickel Chromium)	5.75 to 6.00
3300 (Nickel Chromium)	8.00 to 8.25
3400 (Nickel Chromium)	7.00 to 7.25
5100 (Chromium Steel)	3.75
5200*(Chromium Steel)	7.50 to 8.00
6100 (Chromium Vanadium bars)	4.75 to 5.00
6100 (Chromium Vanadium spring steel)	4.50 to 4.75
9250 (Silico Manganese spring steel)	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb., f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are $10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets the net ton bar price applies.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic	$0.32	Buffalo	$0.265	St. Louis	$0.43	*Pacific Coast	$1.15
Philadelphia, export	0.235	Cleveland	0.215	Kansas City	0.735	*Pac. Coast, ship plates	1.20
Baltimore, domestic	0.31	Cleveland, Youngstown Comb	0.19	Kansas City (pipe)	0.705	Birmingham	0.58
Baltimore, export	0.225	Detroit	0.29	St. Paul	0.60	Memphis	0.56
New York, domestic	0.34	Cincinnati	0.29	Omaha	0.735	Jacksonville, all rail	0.70
New York, export	0.255	Indianapolis	0.31	Omaha (pipe)	0.705	Jacksonville, rail and water	0.415
Boston, domestic	0.365	Chicago	0.34	Denver	1.26	New Orleans	0.67
Boston, export	0.255			†Denver (pipe)	1.17		

*Applies minimum carload 80,000 lb. †Minimum loading 46,000 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingots and muck bars, structural steel, common wire products, including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

British Iron and Steel Market

Railroad Strike and Political Situation Loom Large—Depreciation of Exchanges a Continental Factor

(By Cable)

LONDON, ENGLAND, Jan. 22.

General trade position is complicated by the political situation and railroad strike. Some steel works already have ceased rolling, owing to shortage of fuel supplies. Some (coal) pits already have been closed through shortage of trucks (coal cars) and motive power.

Pig iron prices as yet are unaffected. The tendency otherwise is downward, on continued Continental competition. Buyers generally, however, are cautious.

Finished steel is dull for export but fair on recent domestic buying on railroad reconstruction contracts. The Staveley Coal & Iron Co., Ltd., has secured orders for 4000 tons of cast iron pipe for the Hull Corporation. Clyde shipyards are offering tenders for the construction of 16 motor vessels for a new England-Australia service. Guest, Keen & Nettlefolds, Ltd., propose to erect a steel plant at Melbourne, Australia.

Continental position is disorganized by fluctuations in the exchanges and congestion on the railroads of Belgium, Luxemburg and Lorraine. Some merchant houses have sold cheaply, but the works generally are disinclined to lower prices. Merchant bars are being sold at £7 (1.32c. per lb.) cost and freight to India; wire rods of 5 mm. (about No. 4½ gage) have been sold at £8 ($33.76) f.o.b., both quotations being for February.

Société Anonyme des Laminoirs, Hauts Fourneaux, Fonderies et Usines de la Providence, Marchienne-au-Pont, Belgium, and Société Anonyme des Acieries d' Angleur, Tilleur, Belgium, are sharing a Chilean 9000-ton rail order. Angleur and the Société Lorraine des Acieries de Rombas are sharing an order from Finland for 12,000 tons of rails. De Wendell et Cie. have secured a Brazilian rail order of 12,000 tons.

Union de Consommateurs de Produits Metallurgiques et Industriels, Hagondange, Moselle, has blown in the fifth of its six furnaces The Société Metallurgique de Knutange has blown in its sixth unit (out of ten).

Tin plate is quiet but steady. Makers are well sold ahead.

Galvanized sheet demand is reviving from Australia and South America, but India is still sluggish.

Black sheets are quiet. Makers are busy on recent heavy Far Eastern sales.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.22 per £1, as follows:

Durham coke, delivered	£1	16s.		to £1	17s.	$7.60 to	$7.81
Bilbao Rubio ore†	1	4				5.06	
Cleveland No. 1 foundry	5	1½				21.42	
Cleveland No. 3 foundry	4	19½				21.00	
Cleveland No. 4 foundry	4	16½				20.36	
Cleveland No. 4 forge	4	15				20.05	
Cleveland basic	4	17½				20.57	
East Coast mixed	5	2½	to	5	3½	21.63 to	21.84
East Coast hematite	4	19	to	5	0	20.89 to	21.10
Ferromanganese	17	0				71.74	
Ferromanganese*	17	0				71.74	
Rails, 60 lb. and up	9	0	to	10	0	37.98 to	42.20
Billets	8	5	to	8	15	34.82 to	36.93
Sheet and tin plate bars, Welsh	8	18¾				37.82	
Tin plates, base box	1	3¾	to	1	4¼	5.02 to	5.12
						C. per Lb.	
Ship plates	9	15		to 10	5	1.84 to	1.93
Boiler plates	13	0		to 13	10	2.45 to	2.54
Tees	10	0		to 10	10	1.88 to	1.97
Channels	9	5		to 9	15	1.74 to	1.84
Beams	9	0		to 9	10	1.70 to	1.79
Round bars, ¾ to 3 in.	10	10		to 11	0	1.98 to	2.07
Galvanized sheets, 24 g.	18	7½		to 18	10	3.46 to	3.49
Black sheets, 24 gage	14	0				2.64	
Black sheets, Japanese specifications	15	5				2.87	
Steel hoops	£12	10s.	&	£12	15s.*	$2.35 &	$2.40*
Cold rolled steel strip, 20 gage	17	12½				3.32	
Cotton ties, Indian specifications	15	0				2.83	

*Export price. †Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Nominal)

Foundry pig iron:					
Belgium	£4	5s.		$17.94	
France	4	5		17.94	
Luxemburg	4	5		17.94	
Billets (nominal):					
Belgium	5	10		23.21	
France	5	10		23.21	
Merchant bars:				C. per Lb.	
Belgium	6	10		1.22	
Luxemburg	6	10		1.22	
France	6	10		1.22	
Joists (beams):					
Belgium	6	5		1.18	
Luxemburg	6	5		1.18	
France	6	5		1.18	
Angles:					
Belgium	8	0	to 8 5	1.51 to	1.55
⅛-in. plates:					
Belgium	7	12½		1.44	
Germany	7	12½		1.44	
¼-in. plates:					
Luxemburg	7	12½		1.44	
Belgium	7	12½		1.44	

Markets Firm and Prospects for Domestic Orders Better—Railroad Purchases Large

LONDON, ENGLAND, Dec. 27.—The iron and steel markets of late have been characterized by a continuance of the firm tone, though business naturally took on a quieter appearance with the approach of the holidays. There is, however, a large amount of work to be done when the plants get going again, nearly all of which is domestic business, the main railroad companies having decided to spend large sums of money on reconstruction and other work, while there are also the government schemes to be taken into consideration. In addition most of the shipyards are fairly busy again after their period of idleness, and in some cases have resulted in plate makers having their order books filled to a larger extent than for some time past. The coming year should, therefore, see business in iron and steel fairly brisk and, while the demand lasts, it is hardly to be expected that there can be any downward tendency of values.

The production of pig iron has been increased by the blowing in of additional furnaces in the Cleveland district, where there are now 48 in operation, whereas in normal times the figure was somewhere round about 70 furnaces. The export demand both for iron and steel is quiet, there being a hesitancy on the part of consumers to place orders, holding the opinion that in the near future there will be offerings of cheap supplies from Continental producers, once the Ruhr plants are in full swing again. Whether this will be so it is difficult to say, as in some quarters it is thought the opposite may be the case, and that Germany may be obliged to purchase from other countries to supplement her requirements. There is no doubt that India and the Far East in particular are turning more and more to Continental material and that some fair buying has been done during the past three to six months. Certainly very little has been coming here from these two quarters apart from orders for specialties, such as tin plates, galvanized and black sheets.

In connection with the railroad schemes, the London and North-Eastern intend to have constructed 273 new locomotives and 12,000 vehicles. The London Midland & Scottish Railway scheme involves a call for 150,000 tons of rails, and these orders have been split up among makers, while £1,000,000 is to be spent on car construction. The Great Western Railway, which is spending £10,000,000, has placed orders for 250,000 tons of rails and accessories, 15,000 tons of wheel tires, and 46,000 tons of wheel centers, while in addition, between 300 and 500 20-ton mine cars will be built. Besides all these orders involving iron and steel direct, large alterations and new constructions of docks, railroad stations, sidings, etc., are being undertaken by the companies.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
[illegible]	12.75	12.12½	49.25	8.25	8.00	6.72½	6.37½
[illegible]	12.75	12.12½	49.00	8.25	8.00	6.77½	6.42½
[illegible]	12.75	12.15	49.25	8.25	8.00	6.80	6.45
[illegible]	12.75	12.25	....	8.25	8.00	6.80	6.45
[illegible]	13.00	12.25	49.37½	8.25	8.00	6.82½	6.47½
[illegible]	13.00	12.37½	50.00	8.37½	8.10	6.85	6.50

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Jan. 22.

More activity and higher prices feature the copper market. Transactions in tin continue fairly heavy, with rising prices. Strength in the lead market is unabated and there has been better demand and higher prices for spelter. Antimony continues to advance.

Copper.—The week has been featured by fairly heavy buying by consumers and inquiry continues in good volume. The result has been an upward trend in prices from the low levels prevailing a week ago and the rebound has been fairly sharp. Electrolytic copper, which about a week ago was selling at 12.37½c., delivered, is now not very plentiful at 12.62½c., with several producers asking 12.75c., delivered. By tomorrow the latter price will probably be the minimum. On the advancing market export buying has increased and the entire market has a considerably better tone. Lake copper is higher at 13c., delivered.

Tin.—The volume of buying of Straits tin has again been fairly heavy. For the week covered by this report at least 750 tons was sold. On Wednesday, Jan. 16, the market was active with about 250 tons changing hands and on the next day the same conditions prevailed with sales totaling 300 to 400 tons. The quietest day of the week was Friday, Jan. 18, when 150 tons was bought by consumers, the buying on other days having been largely by dealers. A fair business was done on Saturday with small lots of spot metal selling as high as 49.87½c. Yesterday light sales of futures were made at 48.75c., with more sellers than buyers. Today the market has been moderately active with 50c. bid and 50.50c., asked, quotations being largely nominal. On the New York Metal Exchange today 100 tons of February-March delivery was sold at 48.37½c. to 48.50c. The London market today was only about £1 per ton lower than a week ago, with spot standard quoted at £250, future standard at £251 10s. and spot Straits at £252 15s. Arrivals thus far this month have been 2620 tons, with 8702 tons reported afloat.

Lead.—This metal continues to be sold at high prices, with considerable activity reported. The buying is all for February-March delivery, with sales made at St. Louis as high as 8.10c. to 8.12½c., and with the New York outside market quoted as high as 8.37½c. January metal is practically unobtainable. Specifications on contract continue heavy and consumptive demand is as high as at any time. The leading interest again advanced its price during the week when on Jan. 18 it announced a quotation of 8c., New York, or $2 per ton higher than had prevailed up to that time.

Zinc.—A distinct reversal of trend has marked the week's development in this market. Prime Western, which a week ago was selling as low as 6.35c., St. Louis, is today quoted at 6.50c., St. Louis, or 6.85c., New York, with sales made at these quotations. One factor in the advance has been an increase in the price of ore of $1 per ton, to $44, and there has also been better buying by consumers, both galvanizers and brass makers.

Nickel.—Quotations for shot and ingot nickel are unchanged at 29c. to 32c. per lb., with electrolytic nickel held at 32c. by the leading producers. In the outside market both shot and ingot nickel are quoted at 29c. to 32c. per lb.

Antimony.—The scarcity of Chinese metal persists and wholesale lots for early delivery are higher with 10.50c. per lb., duty paid, New York, the minimum quotation.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 27.50c. to 28c. per lb., duty paid, delivered, by importers who are able to obtain the metal from foreign producers. Quotations from the leading American producer are not obtainable.

Old Metals.—Business is at a standstill and the market is sluggish. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.25
Copper, heavy and wire	11.25
Copper, light and bottoms	10.00
Heavy machine composition	10.50
Brass, heavy	8.00
Brass, light	6.25
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	6.75
Lead, heavy	7.25
Lead, tea	6.25
Zinc	5.00
Cast aluminum	18.50
Sheet aluminum	18.50

Chicago

JAN. 22.—Tin, lead and zinc have advanced, while copper and antimony remain unchanged. The market is generally quiet although fair quantities of tin, lead and zinc have changed hands. Copper is weak and this is particularly true of electrolytic, which has been sold at ¾c. below lake copper. Among the old metals the only changes are advances in tin grades. We quote in carload lots: Lake copper, 13.25c.; tin, 50.50c.; lead, 8.35c.; spelter, 6.55c.; antimony, 12c., in less than carload lots. On old metals we quote copper, copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9.50c.; red brass, 8.75c.; yellow brass, 7c.; lead pipe, 6.75c.; zinc, 4.25c.; pewter, No. 1, 28c.; tin foil, 34c.; block tin, 39c.; all buying prices for less than carload lots.

Valley Steel Market Stronger

YOUNGSTOWN, Jan. 22.—Independent rolling interests in the Mahoning Valley believe that business this year will be well distributed over the 12-month period. New tonnage has come forward in a substantial way the past 15 days in the sheet market, and the weakness in the black sheet market has virtually disappeared. Prices are firm at current levels in the various grades of sheets, namely, 3.85c. for black, 3c. for blue annealed, 5c. for galvanized and 5.35c. for highly finished auto body stock, all base gages.

The only weak spot in the market at present is in plates, as little plate tonnage is coming through at this time. The Youngstown Sheet & Tube Co., largest independent plate maker in the district, is operating its capacity partly on skelp for its tube mills.

Requirements for the larger sizes of pipe are expanding due to improved conditions in the oil fields, while there is no diminution in the demand for the standard sizes of merchant pipe.

Canadian Coal Miners Strike

Collapse of wage negotiations between union coal miners and the British Empire Steel Corporation at Sydney, N. S., last week brought all Cape Breton and mainland mines to a standstill, as the 12,000 members of district 26, United Mine Workers of America, joined in a walkout. Whether the suspension will grow into a strike awaits the decision of John L. Lewis, president of the union. The old contract lapsed at midnight, Jan. 15. Corporation posters announced wage reductions of 20 per cent, affecting 9000 workers, and negotiations followed in which no agreement could be reached. Silby Barrett, representing the miners, stated to Dominion officials that the men were willing to work under the expired contract, leaving the wage adjustment to a board of conciliation.

PERSONAL

Harry J. Kelley, general mill superintendent of the Lackawanna plant, Bethlehem Steel Corporation, Lackawanna, N. Y., has resigned his position, after 33 years of service in that plant, to become general manager of the Sydney, Nova Scotia, plant of the British Empire Steel Corporation. The resignation was effective Jan. 15. In his new position Mr. Kelley will be associated with George F. Downs, formerly president of the Lackawanna Steel Co. and now a director, a member of the executive committee and vice-president of the British Empire Steel Corporation. When less than 12 years old Harry Kelley made his entry into the steel business as an office boy in the employ of the Lackawanna Steel Co. in 1890, when the company's headquarters were in Scranton, Pa. After working in the machine shop for several years he was promoted to the position of master mechanic. Later he was placed in charge of the rail mill, having the distinction of being the youngest superintendent of a rail mill in the industry. His work caught the eye of Mr. Downs, at that time general superintendent of the Lackawanna plant, who made Mr. Kelley assistant general superintendent in 1918. When the Lackawanna plant passed to the control of the Bethlehem Steel Corporation, Mr. Kelley was recognized by being appointed general mill superintendent.

W. Aubrey Thomas, Niles, Ohio, has been elected president of the Mahoning Valley Steel Co. He succeeds Jacob Waddell, who resigned several months ago. Other officers elected at the annual meeting of stockholders are: John T. Hosack, vice-president and treasurer; John M. Thomas, secretary, and M. A. Jones, assistant secretary. Mr. Hosack was added to the board of directors, which also includes J. D. Waddell, W. Aubrey Thomas, John M. Thomas and M. T. Waddell.

E. S. Brown was added to the board of directors of the Falcon Bronze Co., Youngstown, Ohio, at the annual meeting.

James H. Foster, president Hydraulic Steel Co., Cleveland, has severed his connection with the company to devote his time to other interests. He has been actively operating the company for Thomas P. Goodbody, the receiver, since last October. W. B. Jameson, who has been general superintendent of the Earl Motors, Inc., Jackson, Mich., has been placed in charge of manufacturing activities of the Hydraulic Steel Co. and the Hydraulic Steelcraft Co. plants but his activities will not extend to the Cleveland Welding & Mfg. Co. plant. Fred W. Yates, New York, has resigned the chairmanship of the preferred stockholders' committee and at his request James A. Drain of Washington, will succeed him.

David H. Ladd has been elected president and general manager of the Detroit Equipment Co., 4612 Woodward Avenue, Detroit. He and Willis P. Thomas, vice-president, Melvon F. Doty, treasurer, and R. M. Connor, secretary, comprise the board of directors.

J. D. A. Morrow has been made vice-president and general manager, and has been elected a member of the board of directors of the Joy Machine Co. Mr. Morrow was active in connection with the coal industry during the World War. He was formerly vice-president of the National Coal Association, and is now president of the Morrow-Callahan Coal Co. and the John Morrow Coal Co., both of Cincinnati. He will retain his interests in these companies and will continue to direct their activities.

J. L. Edwards, formerly Pittsburgh representative F. J. Ryan & Co., Philadelphia, has associated himself with the George J. Hagan Co., Pittsburgh, and is attached to the oil and gas furnace department of that company.

George W. Simmons of St. Louis, vice-president Winchester-Simmons Co. and Simmons Hardware Co., has been elected vice-president of the Mechanics and Metals National Bank of New York. Prior to the merger which formed the Winchester-Simmons Co., he was one of the active management heads of the Simmons Hardware Co. The new duties which Mr. Simmons will assume Feb. 1 make it necessary for him to withdraw from active participation in the affairs of the Simmons company and the Winchester-Simmons Co. However, he will retain his financial interests and will continue as a director of both companies.

Robert W. White, assistant general sales manager of the Linde Air Products Co., New York, manufacturer of oxygen for welding and cutting of metals, has been appointed general sales manager of the Carbide & Carbon Chemicals Corporation. L. M. Zimmer, western sales manager of the former company, will succeed Mr. White, and both will continue to make headquarters at 30 East Forty-second Street, New York. Other changes in the Linde company include the appointment of E. E. Radcliffe as assistant sales manager of the eastern division, Herman Ullmer, assistant sales manager of the western division, with headquarters in Chicago, and F. E. Stoppenbach, district sales manager in New York.

R. C. Kirk, who has been vice-president and treasurer of the Follansbee Brothers Co., Pittsburgh, has been appointed general manager of the company, succeeding William Banfield, who recently retired, closing a connection with the steel industry of more than half a century, the last 20 years of which were spent with the Follansbee company. Mr. Kirk also has long been identified with the steel industry and was president of the La Belle Iron Works at the time of its merger with the Wheeling Steel & Iron Co. and the Whitaker Glessner Co. to form the Wheeling Steel Corporation.

Peirce Lewis, formerly connected with Kawneer Mfg. Co., the Detroit Steel Products Co. and as assistant advertising manager with the Truscon Steel Co., Detroit, has been appointed advertising and sales promotion manager of the latter. He will have complete charge of the department which is now located at the home office in Youngstown, Ohio.

H. P. Parrock, for several years with the Lumen Bearing Co., Buffalo, and more recently with the Draper Corporation, Hopedale, Mass., has opened an office at 131 State Street, Boston, and will engage in private practice as engineer, specializing in foundry and machine shop practice in iron, steel or brass and collateral work.

Edwin C. Henn, vice-president and general superintendent of the National Acme Co., Cleveland, has been elected president of the Cleveland Athletic Club for the ensuing year.

R. E. Ludwick, formerly sales manager for the Cleveland Crane & Engineering Co., Wickliffe, Ohio, has joined the sales staff of the Whiting Corporation, Harvey, Ill. He will make headquarters at the Chicago sales office at 945 Monadnock Block.

M. V. Dreyspool has been appointed manager of the New York office at 299 Madison Avenue, of the General Drop Forge Co., Buffalo. He also represents the Erie Steel Barrel Co., Erie, Pa.; Canada Tack & Nail Co., Morrisburg, Canada; Danville Iron & Steel Corporation, Danville, Pa., and the Milton Mfg. Co., Milton, Pa.

H. L. Usher, New York representative of the Oliver Iron & Steel Corporation, Pittsburgh, with office at 50 Church Street, hereafter will also look after the interests of the Morris & Bailey division of the corporation.

George H. Sage, president Berlin Construction Co., New Britain, Conn., steel fabricators, has gone to Florida for the winter.

C. A. Lord, assistant western sales manager for the Concrete Steel Co., with headquarters at Chicago, has been appointed district sales manager in the southwest territory, with headquarters at the Finance Building, Kansas City, Mo., succeeding E. C. Marqua.

Ralph W. Clark, New York manager Pilling & Co., Philadelphia, has been elected a vice-president of that company. President W. S. Pilling and other officials were reelected.

Judge Elbert H. Gary, chairman United States Steel Corporation, accompanied by Mrs. Gary, is spending a few days in Washington.

OBITUARY

JOSEPH D. ADAMS, president J. D. Adams & Co., Indianapolis, manufacturers of road building machinery, died Jan. 17, following a brief illness with pneumonia. Mr. Adams was the inventor of the Adams leaning wheel grader, the principal product of his company. He was born in Parke County, Indiana, in 1853 and spent his early years on a farm there. His interest in road improvement machinery later took him to Indianapolis, where for a time he sold road machinery and constructed bridges. In 1874 he founded J. D. Adams & Co. Two sons, Roy E. Adams and William R. Adams, who have been associated with him in the company, survive, as does also Mrs. Adams.

HOMER B. BELFIELD, Hartford, Conn., purchasing agent for the Billings & Spencer Co., died Jan. 14 at the Hartford Hospital, following an operation. Mr. Belfield had been connected with the Billings & Spencer Co. for 28 years.

FREDERICK LINES, treasurer Matthews Mfg. Co., Worcester, Mass., manufacturer of metal stampings, died at his home on Jan. 16, aged 57 years. He was born in Birmingham, England, and came to the United States as a private secretary when he was 19 years old. After some years in New York, he went to the Scovill Mfg. Co., Waterbury, Conn., as secretary, and remained there more than 10 years. He became associated with the Matthews Co. 15 years ago as executive head of the business.

ALBERT CHARLES, for 30 years secretary-treasurer of the Cumberland Steel Co., Cumberland, Md., died Nov. 30, aged 59 years.

HARRY E. DILLER, metallurgical editor of *The Foundry*, Cleveland, died Jan. 17, following a short illness. He was a chemical and metallurgical engineer and took an active part in the affairs of the American Foundrymen's Association and the American Society for Testing Materials. He graduated with a master's degree from Pennsylvania State College and was first employed as chemist at the Homestead plant of the Carnegie Steel Co. Before joining the editorial staff of *The Foundry* five years ago, he was chief of the testing laboratory of the Erie, Pa., plant of the General Electric Co.

EDGAR G. MURRAY, aged 51 years, purchasing agent of the Youngstown Sheet & Tube Co. since September, 1902, died Jan. 20, at Clifton Springs, N. Y., where he had gone on New Year's Day. Following a nervous breakdown, he contracted pneumonia which brought death. Mr. Murray had been connected with financial and industrial concerns in the Mahoning Valley throughout his life, except for a short time when he was in the purchasing department at Pittsburgh of the Carnegie Steel Co. The body was brought to Youngstown for interment.

GLENN W. NORRIS, salesman in the Pittsburgh office of W. C. Runyon & Co., died at his home in Pittsburgh after a brief illness, Jan. 20. He was 33 years old and a native of Youngstown, Ohio, and before going with the W. C. Runyon & Co. had been with the Youngstown Sheet & Tube Co. in its Youngstown and Pittsburgh offices, the Liberty Steel Products Co. and the Iron Trade Products Co., Pittsburgh.

SAMUEL A. RANKIN, treasurer Hubbard & Co., Pittsburgh, died at his home in Pittsburgh, Jan. 19. He was 83 years old and a veteran of the Civil War. He had been with Hubbard & Co. for 54 years.

REDUCING EXPENDITURES

Director Lord of Bureau of the Budget Tells How Progress Is Being Made

WASHINGTON, Jan. 22.—Progress made in reducing the cost of government through the work of the Bureau of the Budget was explained yesterday by Director H. M. Lord of the bureau at the sixth regular meeting of the Business Organization of the Government after President Coolidge had spoken briefly, urging strict economy in Government operation.

Director Lord declared that a notable increase in expected revenue and a material reduction in proposed expenditures promise a surplus of $329,000,000 for the present fiscal year, but stated that this in no wise releases executive pressure for the strictest economy and offers no warrant for the expenditure of one penny of Government funds that can be withheld without detriment to the public service.

"The people of this country for five long years have patriotically borne a crushing burden of taxation that has fettered business, stifled initiative and cast its oppressive chilling shadow over the hearthstones of the nation," said the director.

Turning to economies effected by new forms of contracts and standardization of specifications for materials bought by the Government, Director Lord declared that the Interdepartmental Board of Contracts and Adjustments continues to function constructively. The new standard form of lease, a product of this board, which has taken the place of more than 100 kinds of leases formerly in use, it was stated, is proving satisfactory. A tentative draft of a new construction contract has been sent to department heads, Director Lord said, and to well-known reputable contractors for criticism and comment. The board also has in hand a new supply contract, it was stated.

The Federal Specifications Board, Director Lord said, has promulgated 114 standard specifications and has 60 technical committees at work covering a large portion of commodities purchased by the Government.

"In formulating standard specifications for the use of the Government," Director Lord explained, "all of the technical committees of the Federal Specifications Board are carefully considering the question of elimination of unnecessary grades, sizes and style of all the various commodities. Typical examples of this elimination are standard specifications for builders' hardware, plumbing fixtures and beds and bunks. In the case of the beds, the number of individual specifications will be cut down from 23 to five or six."

These standard specifications have saved the Government already a great deal of money, it was asserted. General Lord cited the case of varnish, showing that a commercial varnish costing $4.37 was in almost universal use by the Government, but that a varnish prepared by the board specifications is costing $1.44 a gallon.

The Federal Liquidation Board, General Lord said, is closing up what was very properly termed the most colossal selling effort in history. There has been liquidated to date surplus property valued at $3,691,002,762, for which $1,282,492,909 has been received. There have been transferred between the Federal agencies supplies valued at $357,614,823. There is in hand today, it was said, for disposition, surplus property with an actual value of approximately $30,000,000. Road making materials of an estimated value of $195.870,144 have been transferred to the Department of Agriculture for use by the States.

The Southern Ohio Pig Iron and Coke Association will meet in Cincinnati Jan. 29. The American Institute of Mining and Metallurgical Engineers and the members of the Cincinnati Coal Exchange will also attend the session. Subjects to be discussed include methods for sampling and evaluating coals and also the effect of the three shift day on compensation rates in Ohio.

FABRICATED STEEL BUSINESS

Bookings of Week Largest in a Long Period—Fresh Inquiries for 38,000 Tons

Bookings coming to light in the week in fabricated steel work give a total of over 52,000 tons, the largest weekly amount for many months. Over 60 per cent was for private enterprises. About 4000 was for the railroads and 15,500 for public work. The total of fresh projects appearing was also large, being 36,000 tons, with about 13,000 tons each for public and private jobs and 8000 for the railroads. The week's awards include:

Four-Fifty-Five Seventh Avenue Corporation, loft building at that address, New York, 3300 tons, to Hedden Iron Construction Co.

Macmillan Publishing Co., building at 1 West Forty-seventh Street, New York, 1400 tons, to Hedden Iron Construction Co.

Hutzler Brothers, Baltimore, Md., addition to department store, 400 tons, to Bethlehem Steel Fabricators, Inc.

Apartment building, East Sixtieth Street, New York, 400 tons, to Harris Structural Steel Co.

Dayton Light & Power Co., Dayton, Ohio, 375 tons, to American Bridge Co.

Baltimore & Ohio Railroad, bridges, 650 tons, to American Bridge Co.

Public school No. 80, New York, 1000 tons, to Hay Foundry & Iron Works.

Chicago Tribune tower, Chicago, 7000 tons, to American Bridge Co.

County of Los Angeles, Cal., unit 1, Museum of History, Science and Art, 1800 tons, to Llewellyn Iron Works.

Northern Pacific Railroad, truss, girder and I-beam spans, 1675 tons, to American Bridge Co.

Highway bridge, near Cape Girardeau, Mo., 303 tons, to Missouri Bridge & Iron Co.

Commonwealth Edison Co., Chicago, steel for turbine room, Crawford Avenue station, 283 tons, to American Bridge Co.

Union Pacific, repairs to bridge, 165 tons, to American Bridge Co.

Great Northern Railway, four girder spans, 158 tons, to American Bridge Co.

U. S. Gypsum Co., extension to kiln building, Genoa, Ohio, 170 tons, to Pittsburgh Bridge & Iron Co.

Louisville & Nashville Railroad, warehouse at New Orleans, 1400 tons, general contract to Doullot & Williams.

Ford Motor Co., assembly plant at Louisville, Ky., 1650 tons, reported awarded to American Bridge Co.

Kentucky Hotel, Louisville, 2200 tons, to American Bridge Co.

Standard Oil Co., 4 80,000-bbl. oil storage tanks for Whiting, Ind.; 1200 tons to the Chicago Bridge & Iron Works. The company will itself fabricate tanks requiring 3800 tons.

Bank of America, Wall and William Streets, New York, 6000 tons, to be fabricated by American Bridge Co.

City of New York, central motor repair station, 10,000 tons, reported to have been awarded to New York Shipbuilding Corporation.

Pueblo Conservation District, Colorado, 2400 tons, Mt. Vernon Bridge Co. and Virginia Bridge & Iron Works each low bidder on 1200 tons.

J. L. Hudson Co., store, Detroit, 4500 tons, to Whitehead & Kales.

Holland Bread Co. Toledo, Ohio, factory, 145 tons, to American Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

City of New York, fabricated steel water pipe line to Staten Island, 3000 tons.

Standard Oil Co., tanks for erection in various parts of New England and New York, 4500 tons.

Standard Oil Co., 14 tanks for erection near Baton Rouge, La., 500 tons.

Delaware & Hudson Railroad, remodeling of bridge at Troy, N. Y., about 800 tons.

Berwick Cake Co., Boston, extension of plant, 400 tons.

Loft building, Seventh Avenue and Thirty-ninth Street, New York, 2500 tons.

U. G. I. Contracting Co., remodeling of gas plant at Harrison, N. J., 350 tons.

Atlantic City, N. J., highway bridge, new floor, 300 tons, mostly plates.

Art Color Printing Co., Dunellen, N. J., 600 tons.

Hering loft building, Thirty-fifth Street, New York, 1300 tons.

Illinois Light & Power Co., Peoria, Ill., transmission towers, 1500 tons.

Mobile & Ohio Railroad, 150-ft. truss span, 200 tons.

Michigan Central, plate girder spans, 460 tons.

Louisville & Nashville Railroad, bridge at New Orleans, 6500 tons, bids close Jan. 31.

Columbia Club, Indianapolis, 900 tons, bids being taken.

Masonic Temple, Portsmouth, Ohio, 850 tons, bids close Feb. 11.

Meredith Hotel, Huntington, W. Va., 350 tons, bids being taken.

U. S. Engineer's Office, Milwaukee, two steel scows and one barge, 300 tons, bids taken Jan. 16, Sturgeon Bay Dry Dock Co. low bidder at $47,500.

Boston & Albany Railroad, freight house at Springfield, Mass., 600 tons.

Three viaducts for Buffalo, 2000 tons, all bids rejected and work to be readvertised.

Cadillac Motor Car Co., Detroit, gray iron and aluminum foundry, 500 tons.

General Match Co., Reading, Ohio, 200 tons, bids taken.

Snelling-Mendota bridge, Minneapolis, 7500 tons.

Fair Store, Chicago, additional 400 tons.

Union Car Co. plant, Casper, Wyo., 200 tons.

RAILROAD EQUIPMENT BUYING

Orders for 2880 Cars and 13 Locomotives—Inquiries for 6900 Cars

Notable activity marks the railroad equipment field. Orders for 2822 freight cars, 58 passenger train cars and 13 locomotives are noted and fresh inquiries for 6800 freight cars, 95 passenger train cars and 6 locomotives. The chief items are given below.

The railroads on Jan. 1 this year had 158,175 freight cars in need of repair, or 6.9 per cent of the ownership, according to reports filed by the carriers with the car service division of the American Railway Association. This was a decrease of 57,836 compared with the number in need of repair on Jan. 1, 1923. Of the total number, 118,653 were in need of heavy repair at the beginning of this year.

The Seaboard Air Line has divided orders for 932 flat car bodies equally between the Richmond Car Works and the Virginia Bridge & Iron Co.

The Western Pacific has ordered 775 refrigerator cars from the American Car & Foundry Co. and 5 Mallet and 5 Mikado locomotives from the American Locomotive Co.

The Illinois Traction has ordered 100 40-ton box cars from the American Car & Foundry Co.

The New York, Chicago & St. Louis is inquiring for 100 Rodger ballast cars of 50-ton capacity.

The American Tar Products Co. is asking for bids on 50 tank cars.

The Santa Fe is inquiring for 5000 freight cars as follows: 1000 box, 2000 refrigerator, 500 stock, 500 gondola 500 flat and 500 automobile cars. This road also contemplates the purchase of considerable passenger equipment but has not yet put out inquiries.

The New York Central has put out inquiries for 50 coaches and 20 dining cars of a total put at 129 and it also has a freight car program said now to embrace 18,000 cars, although it has not yet asked for figures on the latter.

The Philadelphia & Reading has distributed orders for 1000 70-ton hopper cars among a number of car builders.

The Union Pacific is inquiring for 500 tank cars.

The Southern Pacific is inquiring for 25 passenger cars in addition to the 50 previously reported and its total is put at 125.

The Northern Pacific is inquiring for 200 ore cars of 75-ton capacity.

The New York Central is inquiring for 500 double sheathed box cars for the Rutland.

The Maine Central is inquiring for 100 general service cars of 50 tons capacity and 250 40-ton single sheathed box cars.

The Central of Georgia placed 15 passenger cars with the Pullman Co., including 6 partition coaches, 4 postal and baggage cars, 3 baggage and express cars and 2 coach and baggage cars.

The Burlington has ordered 6 dining cars from the Pullman Co.

The Alabama & Vicksburg has placed 1 dining car with the American Car & Foundry Co.

The Pacific Coast Railway has placed 15 general service cars of 50 tons capacity with the Pacific Car & Foundry Co.

The Louisville & Nashville is inquiring for 100 Rodger ballast cars and is said to be contemplating the purchase of 8000 freight cars.

The International & Great Northern is inquiring for 6 Mikado locomotives.

BOOK REVIEWS

Industrial History of the United States. By Edward S. Cowdrick. viii + 411 pp. Ronald Press, New York City, 1923.

Mr. Cowdrick has written a topical review of the main economic and financial events in the industrial development of the United States and for the advanced high school pupil, the business school student, the freshman at college, and the non-college graduate business man, the book should be of value. The discussion of economic, financial, and industrial questions is elementary and simple, and is written in a plain, straightforward style. The economist, statistician, research worker, and business man of wide experience, however, will find little in the book that is new and refreshing. To these readers, the volume will appear like a well composed compilation of limited but good collateral sources of information.

The author believes in emphasizing the economic interpretation of history in line with the more progressive writers and teachers of today. In some ways, Mr. Cowdrick lays almost undue stress upon this point of view when he says that "he who would search out the real springs of American thought and action must go beyond the superficial expressions found in politics, in society, and in sports, and must go to the mine, the workshop, and the office and mark the American at his work." In some ways, however, there has been too much emphasis of late placed on economic factors of history rather than on the social and moral influences that have shaped the destiny of nations.

The book is divided into four sections: (1) an introduction, (2) the history of America before becoming a nation, (3) the development of the nation in its formative period and (4) the position of the United States as a dominant industrial power. The industrial history of the country until after the Revolution provides scant material for an author reviewing these events, and while Mr. Cowdrick has made a good summary account of this period, the first 70 pages could have well been omitted from this "industrial" history. Previous to the beginning of manufacturing, industrial history and labor problems as we view them today practically did not exist. If the reader has a general knowledge of English and American Colonial history and is seeking the industrial history of America, this portion of the book will prove somewhat wearisome.

The review of the conditions surrounding American labor begins somewhat later (p. 142) and is well developed in the remainder of the book. Mr. Cowdrick's analysis of labor conditions during the Civil War, the Reconstruction Period, and just preceding and after the World War is skilfully done. His point of view is distinctly liberal when he discusses the effect of paying high wages to American labor (p. 241). "Partly as a result of these high wages, and partly causing them, workmen in the United States at most periods have shown intelligence and efficiency superior to those of laborers in other parts of the world. This has acted directly to the advantage of the employers and of the public at large. In addition, the workers themselves, in their relative prosperity, have been among the best customers for the manufacturer and the merchant. An indirect benefit of the high wage system lies in the fact that it has forced the employer to adopt constantly higher standards of organization and managerial ability and to do a constantly increasing proportion of physical work by means of labor-saving machinery."

The author throughout the book has been neutral and fair in discussing the mooted subjects underlying the industrial relations problems of today. In fact, at times as when considering the Kansas Industrial Court, the Railroad Labor Board, industrial representation, and the 12-hour day in the steel industry, Mr. Cowdrick's diction is almost colorless, and he writes more like a statistical reporter than as an author of an industrial history.

At the end of each chapter, a list of review questions and supplementary readings are given. In the entire book, a total of 208 suggested references for reading are thus given. Of these, only 72 are from separate and distinct sources. One book has been listed 18 times, one 16 times, one 11 times, and four 8 times. This situation depicts a weakness in the variety of the collateral information suggested by the author on such large subjects, although the quality of the sources is excellent.

Cast iron welding by the oxy-acetylene process is dealt with in a booklet of 155 pages published recently by the Linde Air Products Co., New York, and compiled by T. C. Fetherston of that company. Adequate preheating, proper welding practice and suitable annealing are given as key factors in cast iron welding. In addition to chapters on welding equipment, methods to be employed in properly preparing the work for welding, best welding practice and the proper annealing of the welded castings, the methods of finishing and the testing of the welds are also discussed. Several pages are given to the estimating of welding costs. The successful welding of cylinder blocks, gears, and many other large parts is given in a chapter devoted to typical examples of welding cast iron. Ten practical problems in cast iron welding are discussed in the appendix. The booklet is clearly written and well illustrated.

New Books Received

Lathes, Their Construction and Operation. By George W. Burley. Second revised edition. Pages 232 + viii, 4¾ x 7½ in.; illustrations, 200. Published by Scott, Greenwood & Son, 8 Broadway, Ludgate, London, E. C. 4, and D. Van Nostrand Co., 8 Warren Street, New York. Price, 7s. 6d.

Bureau of Standards Report for Year Ended June 30, 1923. Pages 330, 6 x 9 in. Published by Washington Government Printing Office.

Filing Department Operation and Control, From the Standpoint of the Management. By Ethel E. Schofield. Pages 318, 6 x 9 in.; illustrated. Published by Ronald Press Co., 20 Vesey Street, New York. Price, $3.

Das Aetzen der Metalle und Das Färben Der Metalle. By Georg Buchner. Pages 207, 5¾ x 8¾ in. Published by M. Krayn, 39 Genthinerstrasse, Berlin, W., Germany. Price, $1.25.

Elektrolytische Metall-Abscheidungen. By Georg Buchner. Pages 304, 7 x 10¼ in. Published by M. Krayn, 39 Genthinerstrasse, Berlin, W., Germany. Price, $2.50.

Die Galvanischen Metallniederschläge und deren Ausführung. By Hubert Steinach and Georg Buchner. Pages 184, 7 x 10 in.; illustrations, 87. Published by M. Krayn, 39 Genthinerstrasse, Berlin, W., Germany. Price, $1.50.

American Society for Testing Materials. Proceedings of twenty-sixth annual meeting. In two volumes: Part I, committee reports; part II, technical papers. Pages, 1006 and 682, respectively; illustrated. Published by American Society for Testing Materials, 1315 Spruce Street, Philadelphia. Price, $6 each, in paper, and $6.50 in cloth binding.

United States Employment Service. Its History, Activities and Organization. By Darrell Hevenor Smith. Pages 130, 6 x 9 in. Published by Johns Hopkins Press, Baltimore, Md. Price, $1.

The Manufacture of Electric Steel. By Frank T. Sisco. Pages 304, 6 x 9 in., figures, 44. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $3.

Interstate Commerce Commission. Thirty-Seventh Annual Report. Pages 256, 6 x 9¼ in. Published by Government Printing Office, Washington.

Industrial Health. Edited by George M. Kober and Emery R. Hayhurst. Pages 1184, 6½ x 9½ in.; figures, 53. Published by P. Blakiston's Son & Co., 1012 Walnut Street, Philadelphia.

Molding Sand Problems in the Foundry

(*Continued from page* 299)

and quartz being the best known heat resistants. By close observation of the grains after vibrating and before testing, he soon becomes familiar with these. Occasionally considerable quantities of small particles of mica or mica schist will be noticed. This is invariably a good indication of heat-resisting qualities. It will be readily understood that if molding sand has not the foregoing heat-resisting qualities, it will soon weaken and cause trouble. Assuming that sand had its origin in slate, or similar rock, it cannot be expected to be a good heat resistant.

Thus, by considering the foregoing, it will be seen that the physical structure of the sand must also be studied to avoid losses. A sand of the proper fineness may have too high a bond, which reduces the permeability of the sand, causing losses termed blow, cold-shut, scabbed work, and where it is caused to boil by excess moisture, excess slag or pinholes result in the casting. The remedy for this is to have another sand of the same fineness, but with less bond for blending purposes. It is not good practice to blend sands with too wide a difference in fineness as they are very apt to separate by the heat and flow of the metal, causing a dirty finish or leaky castings.

The Vibratory Test

A sand may be of the proper fineness, but lack sufficient bond. In this case the sand would quickly weaken. In order to measure the proportions of bond and silica, as separated by water (not the total silica as determined by chemical analysis), also to be able to examine the grain and determine its probable source, and to satisfy ourselves that the general texture of the sand is suitable for the class of castings the vibratory test is provided.

Foundrymen are more or less skeptical of new devices or innovations in molding methods, and are very slow to accept them. That is one peculiar trait of the man in the foundry—he invariably keeps himself on the defensive. The vibratory method is more or less retarded by this attitude. Its simplicity and cheapness does not impress the average foundryman with its real value. Many seem to confuse this method with that of our forefathers—the old practice of dissolving sand in water and allowing it to settle by gravity alone. The only similarity between these tests is that water is used, but by no possible means can the same results be obtained without vibration.

Is it not a reasonable conclusion that the student or chemist made this the dividing line between chemical and physical study of molding sand? Branching out into the chemical analysis of clays, etc., and the various scientific studies of the permeability of sands, these are no doubt very accurate and valuable to the scientist, but on account of the delicacy of the tests, accuracy required, lack of knowledge of chemical terms and mathematical problems required, these tests are placed beyond the reach of the "average" man in the foundry.

Nature disintegrated the rock, carried it off, washing out the softer rocks and impurities and depositing it, grinding it finer and finer, forming the bonding elements, separating it into the various finenesses by water and gravity alone. Is it not fitting that by using water and the laws of gravity assisted by vibratory movement, a physical study of the sand should be devised? The writer firmly believes that when laboratory studies are made along physical lines and microscopic measurements govern the fineness of sands selected, we will obtain a greater benefit than we have had from the chemical studies which have not as yet proved applicable to our daily foundry practice.

It is obvious that any form of molding sand test used must determine the physical qualities of the sand and be applicable to the foundry alone and simple enough to be made by the foreman or his assistants at any time without interfering with their regular duties. If it does not assist them in preventing their daily losses caused by the sand in use it is of no value to them whatever.

The vibratory test will be found a "dependable" guide for increasing or decreasing at will the bond or silica in your foundry sand which is in use. It affords a dependable means of studying the physical qualities of new sands. It affords a dependable means of communication between foundrymen, sand men, and all others interested in the production of castings of every grade.

How to Apply the Vibratory Method

Assuming that a daily rack holding six suitable bottles, vibrator and 3-in. rule, with the inches divided in tenths, are provided, first tabulate your daily losses and assumed causes. Segregate all castings which can by any possibility be attributed to the sand or its manipulation. When in doubt as to the cause of loss, attribute it to the sand, as fully 50 per cent of casting losses are due to sand conditions, directly or indirectly, particularly if the equipment and the metal are *known to be in good condition.* Then determine, if possible, whether the greater part of this loss is due to sand which is too "weak" or sand which is too "strong."

Before starting the method, ascertain how much new sand has been added to the heaps each day, and if several grades are used, how much of each. Also in what manner it has been introduced—in large quantities, irregularly, or small quantities at regular intervals. In foundries running individual floors, choose the floor that is giving the greatest loss, if possible.

Teach the molder himself how to make the tests—he will be glad to receive the knowledge. The psychological effect alone in this case would have a beneficial effect not only on the molder himself but on others around him who are watching the tests. The more the molders are impressed with the fact that the sand condition is an important factor in preventing their losses, the better the results will be. The cost would be trivial if a number of floors were equipped. Foundries with quantity production having sand tempering devices or conveying machinery, should have very little trouble in sand control.

The Test: After all new sand of the day has been added, take a sample from a point which would fairly represent the sand of the day. About 3 p. m. fill bottle *not more than one-quarter full* of sand. Fill bottle with clear water (add no chemical). Shake thoroughly until grains are washed. Vibrate about three minutes, using any form of vibrator. Put sample in rack to remain until starting time next day. Clerk will then measure the sample and label the bond and silica with small oval "Dennison" labels, showing figures for each. The foreman or his assistant then determines whether to add or decrease the amount of new sand for the coming day. The clerk also should keep a record of these figures each day, preferably on a sheet, showing a curve of sand content percentage and its relation to the losses each day.

A convenient method is to obtain a quadrille ruled sheet, marking "dates" across top margin. "Percentage" bottom to top on left-hand margin and "losses" left to right across bottom margin. Renew the sheet monthly.

To Determine Proper Proportions: This must be determined by the operator himself and suited to the conditions under which he is required to work and the class of castings he is to produce. The tests must necessarily be run for several weeks before he will ascertain that very small quantities of new sand added or left out will affect the curve mentioned. Then he must determine at what point he gets the best results. This point may be denoted on the sheet by a dotted red line across the sheet at the point he wishes to maintain. A foundry may be divided into sections where different grades of castings are produced, and an entirely different figure determined for each. It is desirable that a "bond" curve be made in black and a "silica" curve in red ink across the sheet. It is not essential that both be kept, but having both, changes are much more noticeable.

Having arrived at the proportion of bond which his work requires to give the best results—that point should be kept in mind at all times. Practice has shown that a variation of 2 per cent above or below this point

will never cause any noticeable change in losses. A change of 4 per cent either way will begin to show in the losses if maintained any length of time. Increasing the bond 6 per cent high will show a serious increase in "blowed" work; likewise 6 per cent below the proper point will cause "weak" sand, if maintained, with increased losses by strain, drop outs, run-outs, etc. Avoid radical changes in amounts of new sand used. A curve showing 6 per cent high in bond one day and 6 per cent low the next, does not necessarily mean increased loss, as it balances itself. When a number of molders are absent or less molds are to be made, if the same new sand is used the bond curve will show increase

Proper Proportions of Bond and Silica

So many have asked, "What is the proper figure for a good molding sand?" The following can be considered as approximately close, although methods of pressing or ramming, also amount of core sand dropping in heaps, or system must be considered: Divide the foundry work into three classes:

For light work	(Under 20 lb.)	Bond 30	Silica 70
For medium work	(20 to 60 lb.)	Bond 50	Silica 50
For heavy work	(60 to 300 lb.)	Bond 25	Silica 75

There will at first seem to be a discrepancy in these figures, but it must be kept in mind that light work will naturally require a finer grain sand. The finer the sand the less bond is required and in most cases the bond figure for light work will be "too strong." Again, the heavy work will naturally require a heavy grain sand, and most likely a higher bond figure will be required, but the figures are given to avoid "excess" bond filling in between the grains and destroying the permeability. As castings from 60 lb. up are invariably made in facings of some form, and as this facing is made of molding sand taken from the regular heap, and the percentage of bond in this is known, it is easily decided whether this facing should be made stronger, or opened up by a high silica sand.

It is somewhat difficult to give exact figures to suit the conditions of other foundrymen, but I will say that if you decide to try it, do so with an open mind. It is only a dependable means of measurement. It will not change your sand, but will assist you in controlling it.

Its use has taught me more about molding sand in the last three years than I have learned in 50 years of foundry practice. When it becomes commonly understood and properly applied, it will provide a dependable means for our communicating with each other regarding bond and silica contents of our sands only so far as it interests the man in the foundry in decreasing his losses and the man who pays in receiving what he pays for, and the sand producer who has always shown himself willing to provide the best material available suited to the class of work required.

Advice to the Sand Man

A word now to the sand man: Test your sand by the vibratory method. Take three samples of sand from each end of your car of sand to be shipped, after it is loaded on the car, cutting straight down from the top of sand to the floor of the car, with a 2 or 2½-in. tube. Mix the samples thoroughly and then test by the vibratory method. Send a copy of these figures with the invoice of every car you ship. Keep a record of the car number and test figures for your own use. This will avoid the old trouble of giving credits for sand not suitable. Having these records, you will be able to provide your customer with any desired change he may wish. Many excellent sands have been turned down through ignorance of the real qualities which made them desirable for the class of work for which they were offered.

The same test applied by the foundryman upon the receipt of his sand will serve to avoid many little misunderstandings which now occur.

In conclusion one might enter into the discussion of the values of the many different sands and their applicability to the various grades of castings produced, but time will not permit. My only interest in presenting this subject is a desire to assist my fellow foundrymen in clearing up this vexatious subject. When the "swab" and "ventwire" disappear from our foundries we will have settled the permeability question. When strained work, run-outs and drop-outs cease, we will have settled the bond question.

COAL STRIKE PROSPECTS

National Association of Purchasing Agents Gives Its Views and Advice

Based on the National Association of Purchasing Agents' survey of coal consumed during December, the volume of business, as a whole, fell off 11.8 per cent, as compared with the preceding month. This was apparently due entirely to interruptions to business on account of shutdowns for repairs and the taking of annual inventories at the close of the year, and the Christmas holiday. Indications are that the business curve will tend upward during January.

"The policy to pursue in providing fuel to keep the wheels of industry turning without interruption, in the event that there is a strike of coal miners on April 1, is the problem the coal buyer has to solve," says the association survey.

"It must be remembered that when the anthracite wage agreement expired on Sept. 1, hard coal mining stopped with the termination of the wage scale, and that mining was not resumed until the miners were granted an increase in wages of 10 per cent.

"It is not likely that union soft coal miners will continue working unless granted at least a similar advance in wages. They will demand a great deal more; an increase of 20 per cent over the present scale, a 30-hr. week of 6 hours per day for 5 days, etc., while many of the operators favor a revision of the wage scale downward.

"This leaves a gap wide enough to make it appear most probable that there will be a suspension, with the possibility of a prolonged struggle, before a new wage agreement is arrived at and accepted.

"The coal buyer, however, cannot wait until April 1 to make a decision as to what to do to safeguard his fuel supply, but must look forward to a probable suspension or strike, and take steps to protect his coal bin by anticipating what the future may develop.

"A good policy to pursue, so far as possible, would be for the consumer to hold in reserve his present stocks of coal and coke, and buy sufficient in addition to current requirements to enable him to build up his stock so as to have on hand by the end of March at least three months' supply. In cases where coal and coke are used only for heating purposes, then a stock on April 1 sufficient to carry him safely through the heating season should be ample. This policy may be pursued without disturbing the coal market, if put into practice at once, for the reason that practically all of the soft coal mines have considerable idle capacity and a large number are closed down entirely on account of lack of orders. This is also true of the coke operations, and the railroads are in position to furnish equipment far in excess of the present demand.

"If a soft coal strike comes, it in all probability will be confined to only the unionized bituminous fields, and the non-union miners will continue to operate as has always been the case. The non-union mines have capacity sufficient to meet at least 50 to 60 per cent of the current needs. Anthracite mines will continue to operate under the agreement arrived at in September, 1923, unless there should be a sympathy strike. Many industrial plants are so equipped that they can substitute oil or gas for coal and do not have to depend on coal."

Mechanical stokers sold in December were reported by 15 plants to number 73, of 32,517 aggregate hp. Except for November, these are the lowest figures of the year. The year's totals were 1464 stokers and 730,446 hp.

Machinery Markets and News of the Works

INQUIRIES INCREASING

Scarcity of Orders, However, a Disappointment to Machine Tool Trade

Union Pacific Railroad Completes Purchase of Machines Costing About $250,000

An increase in the number of inquiries for machine tools offsets to some extent the disappointment caused by the small volume of buying so far this year. While business shows an improvement over that of December, there is much lacking to bring it up to normal expectations.

Railroads and automobile companies, including those making parts and accessories, are among the most active buyers. The purchase by the Union Pacific Railroad of $250,000 worth of tools, as reported in THE IRON AGE last week, has created a better feeling in the Chicago trade. Chicago and Detroit continue to be the best order-producing districts. Automobile companies are placing a good many orders to round out production units bought late in the fall.

The Big Four Railroad has purchased a number of tools for its Beech Grove and Bellefontaine shops and the New York Central continues to buy against its list, last week's orders including a 6-ft. radial drill and a cotter and keyseat milling machine. The American Car & Foundry Co. has bought two car-wheel borers and the Fruit Growers' Express has bought a 6-spindle arch-bar drilling machine. There are expectations that the Southern Railway will soon issue a large list for a new shop, for which plans are now being prepared. The Maine Central is inquiring for 8 machines.

The Ohio Knife Co., Cincinnati, has completed tool purchases totaling about $25,000. The Cleveland Windshield Co., Cleveland, has bought six machines from a Cleveland dealer. The Timken Roller Bearing Co., Canton, Ohio, is expected to be in the market shortly for equipment for plant extensions. An inquiry from a northern Ohio company calls for 10 machines. The Mead-Morrison Mfg. Co., East Boston, has issued a substantial list.

Used tools are finding a good market at prices above the average. The Baldwin Locomotive Works, Philadelphia, was a large buyer of tools auctioned last week at the plant of the Daniels Motor Car Co., Reading, Pa. The Watertown Arsenal, Watertown, Mass., will receive bids until Jan. 30 for the sale of 55 machine tools.

Following a few price advances announced early this month, it is stated in the trade that other machine-tool builders may mark up prices. Unsatisfactory returns on 1923 business afford the explanation for such possible advances.

New York

NEW YORK, Jan. 22.

INQUIRIES for machine tools are fairly numerous, but there is some hesitancy in placing orders. The demand for second-hand tools is fairly active. At a sale last week of the machines in the plant of the Daniels Motor Car Co., Reading, Pa., there was a good deal of competition and substantial prices were paid. The Baldwin Locomotive Works, Philadelphia, was one of the largest buyers. Among some of the larger orders taken by Eastern machine-tool builders in the past week were the following: 10-ft. boring and turning mill to the Pettibone-Mulliken Co., Chicago; 100-ton bushing press to the Bradford Corporation, Chicago; 6-ft. radial drill and cotter and keyseat milling machine to the New York Central Railroad; 6-spindle arch-bar drilling machine to the Fruit Growers' Express; 600-lb. steam hammer to the city of Los Angeles; two car-wheel borers to the American Car & Foundry Co., New York; two car box boring machines to the Chicago Bearing Metal Co., Chicago.

A. S. Pettit & Son, Inc., Huntington Station, L. I., is having plans drawn for a two-story machine shop, 59 x 100 ft. D. N. Dusinberry, Huntington, is architect.

The Turner Construction Co., 242-44 Madison Avenue, New York, has plans for a two-story mechanical shop, 72 x 250 ft., on Grand Avenue, Maspeth, L. I., with portion of structure to be used for storage and distributing, to cost $90,000.

L. Plaut & Co., Inc., New York, has been organized with a capital of $150,000, and 4000 shares common stock, no par value, to take over the company of the same name at 432 East Twenty-third Street, manufacturer of electric and gas fixtures. J. C. Miller and L. and H. Plaut head the new company.

Manual training equipment will be installed in the three-story and basement junior high school to be erected at Amsterdam, N. Y., to cost $450,000, for which bids will be received on a general contract until Jan. 30. L. H. Niles and H. F. Daly, 46 Market Street, are associated supervising architects.

Bids will be received by the Victorian Government Railways, Melbourne, Australia, until Feb. 13 for one turbine centrifugal steam-driven automatic extractor and accessories, with rotating cage 36 in. diameter and 15½ in. deep, suitable for extracting oil from axle box waste packing. Specifications on file at the office of the Bureau of Foreign and Domestic Commerce, Custom House, New York, File No. 116798; also, at the bureau district offices at Philadelphia and Chicago.

A five-story automobile service and repair building, 74 x 100 ft., to cost $250,000 with equipment, will be erected at 2502 Amsterdam Avenue, New York, by Max Marx, 128 Broadway, and associates. Maximilian Zipkes, 25 West Forty-third Street, is architect.

The Board of Contract and Supply, City Hall, Troy, N. Y., is in the market for a caterpillar tractor, about five tons capacity, with loading equipment.

Forging, trimming and tool-making machinery at the plant of J. H. Williams & Co., 150 Hamilton Avenue, Brooklyn, will be offered at a public sale, Jan. 29, including power presses, drop hammers, shears, milling machines, etc.

The New York Steam Corporation, 280 Madison Avenue, New York, plans the installation of mechanical fans, economizers and other equipment at its power plant at Burling Slip.

The Smith-Hamburg-Scott Welding Co., 505 West Fifty-seventh Street, New York, has leased a building to be erected on Marion Street, Long Island City, totaling 12,000 sq. ft. floor area, for a new plant.

The Board of Trustees, Roosevelt Hospital, Inc., 428 West Fifty-ninth Street, New York, will build a one-story power house on Fifty-eighth Street, 70 x 90 ft., to cost $140,000 with equipment. York & Sawyer, 100 East Forty-second Street, architects.

The State Hospital Commission, Capitol Building, Albany, N. Y., will take bids until Feb. 6, for ovens, power equipment and other baking equipment for the Manhattan State Hospital, Ward's Island.

An oil-operated power plant, with boilers, engines, pumping machinery, etc., will be installed in the thirty-five story building, 197 x 425 ft., to be erected by the Parlex Holding Corporation, New York, on Fourth Avenue, Thirty-second

and Thirty-third Street, to cost $18,000,000. The power station will exceed $50,000. John Sloan, 1 Pershing Square, is architect.

The Hammer & Nearpass Co., Fall and South Walnut Streets, Seneca Falls, N. Y., plans to purchase a drill press, 12-in. lathe, emery wheel grinder and other equipment for a repair shop.

The Bar Zim Toy Mfg. Co., New York, has leased space in the building at 83-85 Greene Street, totaling 15,000 sq. ft., for a plant to manufacture mechanical and other toys.

The Stainless Products Co., Broadway, Watervliet, N. Y., has inquiries out for a drop hammer, about 3000 lb. capacity.

The Commonwealth Water & Light Co., Summit, N. J., is disposing of a preferred stock isue of $500,000, the proceeds to be used for extensions and improvements in electric plants and system.

The E. F. Howell Mfg. Co., 222 Union Street, Hackensack, N. J., manufacturer of pipe, plumbing equipment, etc., has plans for a two-story and basement addition, 72 x 115 ft. H. A. Phillips, 404 Hillside Avenue, Nutley, N. J., is architect.

The Navo Coal Co., Keasbey, N. J., has commenced the erection of a number of buildings on the Raritan River for the manufacture of fuel briquettes. Conveying, loading and other machinery will be installed. A power house will be built.

The Illinois Glass Co., Alton, Ill., is reported to be planning for a two-story addition to its plant at Bridgeton, N. J., to cost $150,000 with equipment, replacing a structure recently destroyed by fire.

The plant of the Bijur Motor Appliance Co., Fifteenth Street, Hoboken, N. J., has been leased by the Franklin Baker Co., Philadelphia, and will be used for another line of production. The Bijur company was taken over recently by the General Electric Co., Schenectady, N. Y.

H. P. Lowe, 32 Maple Street, Bloomfield, N. J., is in the market for an 80 or 100 hp. boiler, 100 lb. working pressure.

The Central Ice & Cold Storage Co., Vineland, N. J., will have plans prepared for a three-story ice-manufacturing and cold storage plant to cost $250,000 including equipment. W. H. Parr is president.

W C. Horn Brother & Co., 221 Fourth Avenue, New York, manufacturers of stationery supplies, office equipment, etc., have purchased the factory at 567-79 North Third Street, Newark, and will remove their present plant on Pearl Street, New York, to this location, installing additional equipment.

Manual training equipment will be installed in the high school to be erected at Mahlstedt Lake, New Rochelle, N. Y., cost of which is estimated at $1,000,000. Plans are being drawn by Guilbert & Batelle, Chamber of Commerce Building, Newark, N. J., who state that about five months will be required to prepare for construction.

New England

BOSTON, JAN. 21.

WHILE more interest is shown in metal-working equipment, the market is far from active, yet sufficient business was done the first two weeks of January to cause optimism in the trade. Two new lists developed the past week and a fair aggregate of small inquiries. In addition, prospects temporarily abandoned toward the close of 1923 have come to life again, some involving several pieces of equipment. Of the two lists, the Mead-Morrison Mfg. Co., East Boston, lifting equipment and tractors, is the larger, but details are withheld as a result of certain conditions attending the proposal. The other list is that of the Maine Central Railroad and calls for eight machines.

Recent sales include a large new boring mill to the Remy Electric Co., Louisville, Ky.; three drilling machines and four bench drills, as well as a 14-in. lathe to a Brockton, Mass., manufacturer; a large used power press to a Lynn concern; a used Brown & Sharpe Mfg. Co. universal milling machine to a New Bedford shop; two new die sinkers to a north shore machinery maker; and a Brown & Sharpe automatic centering machine to a Brockton firm.

The Watertown Arsenal, Watertown, Mass., will receive proposals until Jan. 30 for the purchase of 55 machine tools, including a 24-in. Cutler magnet hammer and a 21-in. punch for structural work, together with miscellaneous equipment.

Work will start in the spring on repairs on the 130 x 180 ft. plant of the New England Iron Works Summer Street extension, Boston. L. Kopozynski, 136 Federal Street, Boston, is the engineer.

John Wheeldon, manager Wickwire-Spencer Steel Corporation, Worcester, Mass., and other Worcester interests have purchased property at West Brookfield, Mass. To what purpose it will be put is withheld for the present.

The Crane Mfg. Co., Bristol, Conn., bolts, has acquired the former Pequabuck Bottling Works and will start production as soon as plant adjustments and installation of machinery can be made. James Crane is president.

The Whittredge Portable Steel Building Co., Broad and Commercial Streets, West Lynn, Mass., will erect a one-story, 50 x 200 ft., manufacturing building. Plans are private.

Foundations are going in for a one-story and basement, 40 x 40 ft. compressor plant to cost $20,000 for the Granite Railroad Co., Quincy, Mass. D. D. Merrill, 5 Beekman Street, New York, is the architect.

Bids closed last week for a two-story, 60 x 120 ft. Washington school, contemplated by the town of Belmont, Mass., which will contain manual training departments. McLaughlin & Burr, 88 Tremont Street, Boston, are the architects.

Ashton, Huntress & Alter, 477 Essex Street, Lawrence, Mass., architects, will close bids this week on a two and four-story, 180 x 240 ft. bottling plant on Beacon Avenue, Lawrence, for the Curran & Joyce Co., Common Street, to cost $150,000, for which conveying machinery is required.

Plans are in progress for a two-story, 80 x 100 ft. addition to cost $50,000 for the Continental Wood Screw Co., Mount Pleasant Street, New Bedford, Mass., of which Patrick Sweeney is general manager. Leary & Walker, Times Building, New Bedford are the architects. The improvements will not be made until spring or summer.

Bids close Jan. 31 on a Central high school on Russell Avenue, Watertown, Mass., to contain metal and woodworking shops. George M. Chamberlain, 24 South Market Street, Boston, is chairman of the commission in charge of the project. McLaughlin & Burr, 88 Tremont Street, Boston are the architects.

A manual training department will be installed in the two-story and basement high school to be erected at Rockville, Conn., estimated to cost $400,000. The foundation is being laid. Walter B. Chambers, 111 East Fortieth Street, New York, is architect.

The Stafford Co., 1697-1715 Hyde Park Avenue, Boston, has filed plans for a one-story machine shop to cost $22,000.

The New York, New Haven & Hartford Railroad Co., New Haven, Conn., plans a one-story locomotive repair shop and shed at Stamford, Conn., to cost about $65,000.

The Whittredge Portable Garage Co., Lynn, Mass., has plans for a one-story factory, 50 x 200 ft., for the manufacture of metal portable garages, etc.

The Durfee Mills, Inc., Fall River, Mass., will commence a one-story power house addition on Plymouth Avenue to cost $45,000.

The Strand & Sweet Mfg. Co., Meadow Street, Winsted, Conn., manufacturer of electrical and other wires, plan a two-story addition to cost about $100,000 including equipment.

The Torrington Electric Light Co., Torrington, Conn., contemplates a one-story electric generator plant on Franklin Street.

The Royal Bed Spring Co., 7-9 Summer Street, Worcester, Mass., has tentative plans for a new factory to replace the portion of its work destroyed by fire Jan. 12 with loss about $70,000 including equipment.

Hart & Cooley, Inc., Corbin Avenue, New Britain, Conn., manufacturer of metal lockers, heating registers, etc., has awarded a contract to the C. L. D. Co., New Britain, for a two-story addition, 60 x 75 ft.

The Central Railway Signal Co., Boston, recently chartered with a capital of $200,000 and 2000 shares of stock, no par value, will take over and expand the plant of the company of the same name at Needham Heights, Needham, Boston. M. L. Cox is president.

James Crane, Bristol, Conn., and associates will establish a local plant for the manufacture of a patented bolt, invented by Mr. Crane, and kindred products.

The Atlantic Refining Co., 260 South Broad Street, Philadelphia, will build a distributing and storage plant at Providence, R. I., with capacity of 135,000 bbl. of oil, to cost close to $175,000 with equipment.

The Universal Bronze Bearing Co., Winsted, Conn., has preliminary plans for rebuilding the portion of its plant destroyed by fire Jan. 12 with loss approximating $34,000 including equipment.

The Crane Market

Dullness continues although there are a fair number of inquiries current for overhead cranes of small capacity. In the Pittsburgh district prospects for an active demand for overhead cranes this spring are reported good. Prospects are also good in the New England district. In the New York territory, the inquiry of the General Electric Co., Schenectady, N. Y., for two 100-ton cranes for Pittsfield, Mass., is reported to have been postponed for about a month. The inquiry of Stone & Webster, Boston, Mass., for a 100-ton crane for Fall River is still pending, and an additional inquiry is now current from this company for a 100-ton crane for a southern California project. The American Steel & Wire Co., Worcester, Mass., will install two 20-ton electric traveling cranes in a proposed addition to its cable plant. At Pittsburgh, the Jones & Laughlin Steel Corporation is expected to close in the next few days on two 10-ton cranes for its Pittsburgh warehouse extension.

The South Australian Harbor Board, Adelaide, Australia, is accepting bids for two 10-ton and a 15-ton ganty crane, electric or steam, for 63-in. gage track. Specifications, No. 116741, are available at the Bureau of Foreign and Domestic Commerce, New York and Chicago branches.

Among recent purchases are:

Ford Motor Co., Detroit, a 125-ton ladle crane, from the Morgan Engineering Co.

Florence Pipe Foundry & Machine Co., Florence, N. J., two 15-ton, 61-ft. span overhead traveling cranes, from the Pawling & Harnischfeger Co.

Robins Dry Dock & Repair Co., Brooklyn, N. Y., a 5-ton, 35-ft. span hand power crane for a power plant in New Orleans, La., from the Whiting Corporation.

Joseph T. Ryerson & Son, Chicago, two 10-ton, 61-ft. and 72-ft. spans, double trolley, overhead cranes, from the Whiting Corporation.

Kansas City Bolt & Nut Co., Kansas City, Mo., two 7½-ton, 3-motor, overhead traveling cranes, from the Milwaukee Electric Crane & Mfg. Co.

A. D. Joslin Mfg. Co., Chicago, a 10-ton, 3-motor, overhead crane, from the Northern Engineering Works.

Wickham Piano Plate Co., Springfield, Ohio, a 5-ton, 60-ft. span, 3-motor, overhead crane, from the Northern Engineering Works.

Virginia Bridge & Iron Co., Roanoke, Va., recently in the market for a 25-ton locomotive crane, has purchased used equipment.

Turner Construction Co., New York, a 5-ton, 22-ft. span, 2-motor overhead traveling crane from H. D. Conkey & Co.

American Brake Shoe & Foundry Co., Chicago, six 1-ton, 16-ft. span, hand power cranes from H. D. Conkey & Co.

W. A. Jones Foundry & Machine Co., Chicago, a 3-ton, 22-ft. span, 1-motor, underhung crane from H. D. Conkey & Co.

The American Steel & Wire Co. will erect an addition to its electric cable plant at the South works, Worcester, Mass., which will increase the capacity of the department 40 per cent. It will be a separate building, 60 x 800 ft., one-story of daylight construction throughout, with monitor roof and steel sash windows. The floor will be served by two 20-ton electric traveling cranes. The chief purpose of the building will be to provide additional facilities for the manufacture of paper and lead and varnished cambric and lead electric transmission cables, and also rubber and lead cables, to carry currents of moderately high potentials. The building will be located close to the present cable plant. Construction will begin immediately and it is hoped manufacture will be started before the end of the year.

Buffalo

BUFFALO, Jan. 21.

PLANS are being considered by the Westinghouse Machine Co., Attica, N. Y., manufacturer of stokers, etc., for additions to its works to cost $200,000 including equipment.

The City Council, Buffalo, has authorized an appropriation of $550,000 for a new vocational school in the Kensington section, to be known as the Seneca vocational school. Plans will be drawn at once. The Board of Education is in charge.

The St. Regis Paper Co., Watertown, N. Y., has plans for five additional units at Deferiet, N. Y., one and two stories, to cost $500,000 with machinery. A. L. Miller is company engineer.

The Selflock Nut & Bolt Co., Inc., East Syracuse, N. Y., will increase the capacity of its plant for the production of friction-fit nuts and bolts, cap screws, etc. It will manufacture also heavy machine and carriage bolts for the Bethlehem Steel Co.

The New York State Gas & Electric Corporation, Ithaca, N. Y., is disposing of a bond issue of $2,350,000, a portion of the proceeds to be used for extensions and improvements. S. J. Magee is president.

The Buffalo Bed Spring Co., 154 Oak Street, Buffalo, has filed plans for a one-story extension to cost $25,000. Additional machinery will be installed.

The Cortland County Traction Co., 127 Main Street, Cortland, N. Y., has plans for an addition to its electric power house, 55 x 62 ft., to cost $55,000. L. T. Klauder, Pennsylvania Building, Philadelphia, is engineer.

The Board of Trustees, New York State Hospital for Incipient Tuberculosis, Albany, N. Y., will receive bids until Jan. 31 for refrigerating and cold storage equipment for installation in a building, 44 x 110 ft., at the Raybrook, N. Y., institution.

The Common Council, Springville, N. Y., will issue bonds for $42,000 for extensions in the municipal electric plant, including additional equipment.

The Rome Mfg. Co., Rome, N. Y., manufacturer of die-pressed forgings, etc., has awarded a general contract to E. S. McCarey & Co., 427 West Embargo Street, for a one and two-story addition, to cost $200,000 including equipment. Lockwood, Greene & Co., 101 Park Avenue, New York, are architects and engineers.

The Cohoes Power & Light Co., North Mohawk Street, Cohoes, N. Y., will install an additional unit at its hydro-electric generating plant, to increase the capacity about 15,000 kw. C. A. Davis is vice-president and general manager.

Electric-operated machinery will be installed in the one-story plant, 47 x 115 ft., of the Van Auken Lumber Co., Oneonta, N. Y., to be located at Cobleskill, N. Y., estimated cost $40,000. B. C. Briggs is president.

Philadelphia

PHILADELPHIA, Jan. 21.

JOSEPH KOPPERMAN & SONS, 309 Florist Street, Philadelphia, manufacturers of copper, bronze and other metal products, have engaged H. H. Kline, Bulletin Building, architect, to prepare plans for a new factory at 324-28 New Street.

The Navy Supply Officer, Navy Yard, Philadelphia, will purchase 5000 hexagon head bolts, aero req. 975.

The Philadelphia Suburban Gas & Electric Co., Washington Square, Philadelphia, plans a new electric power house near Edgely, Pa., estimated to cost $250,000.

The Corrugated Container Co., Trenton and Venango Streets, Philadelphia, has plans for an addition, to include remodeling of present factory and installation of equipment.

The Delling Motors Co., 2401-15 Chestnut Street, Philadelphia, will use a plant on the White Horse Pike, near Camden, N. J., recently acquired, for the manufacture of steam-driven automobiles and parts. P. R. Delling is president, and E. H. Delling, vice-president and chief engineer.

George A. Bisler, Jr., 245 North Sixth Street, Philadelphia, manufacturer of paper boxes and containers, is having plans drawn for a four-story addition, 135 x 147 ft., to cost $100,000 with machinery. The William Steele & Sons Co., 219 North Broad Street, is engineer.

F. & F. Bedell, 223 North Sixteenth Street, Philadelphia, will commence the construction of a one-story machine shop, 50 x 75 ft., at 762-64 North Umber Street, to cost $18,000.

The Willys-Overland Atlantic Co., Philadelphia, has been organized to take over the local plant of the Willys-Overland Co., Toledo, Ohio, now being established at South Forty-ninth Street and Grays Ferry Avenue. The new company will be a subsidiary of the Toledo organization, and will develop the Philadelphia branch factory to a capacity of 200 cars per day. George D. McCutcheon is president.

Louis Burk, Third and Thompson Streets, Philadelphia, operating a meat-packing plant, will commence the erection of power house, 50 x 135 ft., to cost about $80,000.

The Haines, Jones & Cadbury Co., 1136 Ridge Street, Philadelphia, manufacturer of plumbing equipment and supplies, is having plans drawn for a three-story factory branch, 90 x 120 ft., on South Main Street, Wilkes-Barre, Pa., Mc-

Cormick & French, Second National Bank Building, Wilkes-Barre, architects.

Davis & Kerrigan, 151 Park Avenue, Wilkes-Barre, Pa., plan for the purchase of a drill press, lathe and other equipment for installation in their machine shop.

George W. Billman, Reading, Pa., has acquired the plant of the Daniels Motor Co., at a receiver's sale for $90,000. The works will be occupied by a company, name temporarily withheld, in a kindred line of manufacture, and about $25,000 will be expended for extensions, exclusive of additional equipment. The service and parts rights of the Daniels company were purchased by the Levin Motor Co., Philadelphia, which purposes to develop this business.

The New Cumberland Paper Box Co., New Cumberland, Pa., is considering a one-story addition to cost $45,000, including machinery.

O. C. Beacraft, vice-president of the Keystone Motor Corporation, Oaks, Pa., has purchased the plant and business of the Perkiomen Bridge Motor Co., Pottstown, Pa., and will expand and operate the works.

The Penn Central Light & Power Co., Altoona, Pa., is completing arrangements for the purchase of the Ebensburg Light, Heat & Power Co., Ebensburg, Pa., and will merge the property. Plans are being perfected for a new electric generating plant at Saxton, Pa., to cost $500,000 with equipment.

The Bliss Plywood Corporation, East Street and the Pennsylvania Railroad, York, Pa., has awarded a general contract to George W. Rupp, Small Building, for a one-story and basement addition, to cost $35,000. D. A. Bliss is head.

The North Penn Power Co., Tioga, Pa., has acquired an electric light and power plant at Galeton, Pa., and plans extensions and the installation of additional equipment.

The Keystone Foundry Co., Honesdale, Pa., has authorized plans for a new one-story plant, replacing a works destroyed by fire several weeks ago. It will cost about $38,000.

The Pennsylvania Power & Light Co., Allentown, Pa., has purchased the property of the Benton Hydro-Electric Co., Bloomsburg, Pa., and plans for the development of the present works for a central hydroelectric generating station.

The Pennsylvania Brake Beam Co., Danville, Pa., is inquiring for a vertical shear, capable of cutting 1½-in. round or square high-carbon bars, also a Kade & Roach No. 1 roll angle straightener.

Chicago

CHICAGO, JAN. 21.

THE purchase of $200,000 worth of machine tools by the Union Pacific for its Los Angeles shops was reported in another column in the issue of THE IRON AGE of Jan. 17. The Atchison, Topeka & Santa Fe has put out an inquiry for a 1600-lb. steam hammer, but has not yet issued its list for the San Bernardino, Cal., shops.

Business has been in encouraging volume the past week, although there have been no outstanding sales, orders being largely for individual machines. The Western Electric Co., which has been a prominent buyer lately, particularly of special equipment for its Kearny, N. J., plant, placed a 20-in. x 10-ft. geared head motor-driven engine lathe for its Hawthorne, Ill., works. The Sachs-Lawlor Co., Denver, Colo., bought a No. 5 geared power press. The Automatic Electric Co., Chicago, has placed orders for two Avey upright drills in addition to equipment which it was reported in this column last week as having purchased. A Wisconsin company has purchased two centerless grinding machines. The Kohler Co., Kohler, Wis., bought a 5-ft. radial drill.

The Niagara Radiator & Boiler Co., 1111 East Eighty-third Street, Chicago, has awarded contract for a one-story addition, 66 x 351 ft., to cost $60,000.

The American Printers Roller Co., Chicago, is taking bids through Weiss & Niestadt, 53 West Jackson Boulevard, on remodeling its four-story plant at Halsted and Rees Streets, at a cost of $50,000.

The Nelson Wiggins Piano Co., 224 Sheldon Street, Chicago, has had plans prepared by Fred V. Prather, 400 North Michigan Avenue, for a four-story factory, 125 x 175 ft., at 1731 Belmont Avenue, to cost $250,000.

The Culter-Proctor Co., stove manufacturer, Peoria, Ill., has awarded a contract for the reconstruction of that portion of its plant which was recently damaged by fire.

Work will be started this spring on a steam power plant, 65 x 100 ft., at the State Teachers College, Macomb, Ill.

Bids will be asked early in April by the Board of Trustees, Macalester College, St. Paul, Minn., for the erection of a one-story power house estimated to cost $50,000, for which plans are being prepared by W. M. Ingeman, Endicott Building, architect.

The Common Council, Tower, Minn., has tentative plans for extensions and remodeling of the present municipal electric plant, including the installation of additional equipment.

The United States Engineer Office, Peoria, Ill., will take bids until Jan. 28 for one gear lathe, one milling and cutting attachment and one lathe chuck, circular 24-9, also for one vertical boiler.

The Great Western Sugar Co., Gering, Neb., will rebuild the portion of its plant recently destroyed by fire with loss estimated at $100,000 including equipment.

The Buda Co., Fifteenth Street, Harvey, Ill., manufacturer of railroad track equipment, has awarded a general contract to T. W. Hobson & Son, Harvey, for a one and two-story addition, to cost $80,000. Chatten & Hammond, 64 East Van Buren Street, Chicago, are architects and engineers.

The G. & W. Electric Specialty Co., 7440 South Chicago Street, Chicago, has tentative plans for a one and two-story factory at Anthony and Kenwood Streets. Paul Williams is president.

The Siems-Stembel Co., 2423 Lake Place, Minneapolis, Minn., will commence the construction of a one-story car repair works on Como Avenue, 140 x 300 ft., to cost $85,000 including equipment.

The Bedford Power Co., Bedford, Iowa, is having plans drawn for a new electric generating station and ice-manufacturing and cold storage plant on adjoining site, estimated to cost $200,000. The Prince-Nixon Engineering Co., Peters Trust Building, Omaha, Neb., is engineer.

Pittsburgh

PITTSBURGH, Jan. 21.

MACHINE tool business in this district still looks better in the prospective than in the actual. Pending business is reported to be extremely heavy even for this time of year, when ordinarily there is much asking of prices against contemplated installations. To the lists which appeared the latter part of last year has lately been added the regular quarterly list of the Westinghouse Electric & Mfg. Co., East Pittsburgh, which contains about 60 tools. It includes the requirements of the new assembling and insulating plant which the company has planned for Emeryville, Cal., for which there is a request for prices on a number of small cranes and one of 10 tons capacity. Plate and bar shearing and cutting tools for the new warehouse of the Jones Laughlin Steel Corporation, Pittsburgh, also have been added to the prospective list. The requirements of the Anchor Drawn Steel Co., which is erecting a plant for the manufacture of cold-finished steel bars at Latrobe, Pa., are also pending.

Bids will be asked in February by the Pennsylvania Wire Glass Co., Pennsylvania Building, Pittsburgh, for the initial unit of its proposed plant at Lewistown, Pa., one-story, 180 x 750 ft., with power house, estimated to cost $450,000. Frank W. Hayes is company engineer.

Manual training equipment will be installed in the proposed high school to be erected at Washington, Pa., estimated to cost $150,000, for which bids will soon be asked on a general contract. G. H. Schwan, Peoples Bank Building, Pittsburgh, is architect.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has tentative plans for additions to its plant at Sharon, Pa., for the manufacture of transformers, costing in excess of $150,000.

The Federal Electric & Radio Corporation, Park Building, Pittsburgh, has engaged John H. Phillips, Fulton Building, architect, to prapare plans for its one-story factory to cost about $40,000 including equipment. John E. Mair is head.

The Virginian Rubber Co., Charleston, W. Va., will rebuild the portion of its plant in the Highlawn section destroyed by fire Jan. 14, with loss estimated at $400,000 including machinery. A. A. Lilly is secretary.

The Prest-O-Lite Co., 30 East Forty-second Street, New York, and Tabor Street, Pittsburgh, manufacturer of acety-

lene apparatus, etc., has awarded a contract to Cuthbert Brothers, Bessemer Building, for extensions and improvements in a building on Lincoln Avenue to cost $42,000.

Bids will be received by the City Council, McKeesport, Pa., until Feb. 11 for two centrifugal pumps, each with capacity of 3,000,000 gal. per day, and two similar units, each with capacity of 7,500,000 gal. per day, with auxiliary equipment, standpipe, etc. Hudson & Myron, 808 Wabash Building, Pittsburgh, are engineers.

Manual training equipment will be installed in the high school to be erected by the County Board of Education at Morgantown, W. Va., estimated to cost $1,000,000. Lynn Hastings, superintendent of the board, in charge.

The Standard Slag Co., Steubenville, Ohio, contemplates the erection of a new plant in the vicinity of McMechen, W. Va., for the manufacture of cement products, estimated to cost $50,000 with equipment.

The Agee Coal Co., Logan, W. Va., has tentative plans for the installation of additional electric power and mining equipment at its local properties. J. B. Agee is general manager.

The Patterson Gear Shift Co., Monaca, Pa., is planning for a new plant at Grove City, Pa., to cost close to $70,000, including equipment.

The Central Automobile Corporation, Fairmont, W. Va., has awarded a general contract to the Concrete-Steel Bridge Co., Clarksburg, W. Va., for a three-story service and repair building, 100 x 122 ft., estimated to cost $80,000.

The United States Engineer Office, Huntington, W. Va., will take bids for 150 cast iron boiler tubes, circular 24-55.

Z. G. Henderson, Bluefield, W. Va., is making inquiries for a quantity of machinery for the manufacture of concrete and cement brick.

The Fairview Electric Light & Power Co., Fairview, W. Va., recently organized, has tentative plans for a local electric plant and system. C. S. McElroy heads the company.

The State Board of Control, Charleston, W. Va., will install a machine shop, woodworking and other departments in the three-story industrial school for colored boys to be erected at Maggie, W. Va., estimated to cost $150,000, for which bids will be received on general contract until Jan. 31. Theodore T. Sansbury, Parkersburg, W. Va., is architect.

Milwaukee

MILWAUKEE, JAN. 21.

MANUFACTURERS of milling machines report improved inquiry from the automotive industries and a number of single machines have been purchased the past week, with more business in prospect shortly. Dealers, likewise, report increased activity. Large lot inquiry or orders are absent. Local industries are re-entering the market after the holiday vacation, but so far it is apparent that the effort is to make replacements rather than effect any material increase in capacity. Public garage and service station construction is furnishing dealers with considerable business, including some used equipment.

The Scolding Locks Hairpin Co., Appleton, Wis., has increased its capitalization from $250,000 to $500,000 and is in the market for some additional special wire-forming, japanning and miscellaneous equipment. Further purchases will be made upon the completion of a new warehouse to be erected at once, relieving pressure upon factory space. E. H. Krug is secretary and general manager.

The Trempealeau County Machine & Repair Works, Arcadia, Wis., sustained an estimated loss of $50,000 to $60,000 by fire which gutted its shop on Jan. 14 and ruined practically all machinery and other equipment. It is planned to rebuild at once. John A. Hess is general manager.

The Fox Motor Car Co., Madison, Wis., will take bids Feb. 1 through Philip Homer, architect, Pioneer Building, local, for a public garage and service building, two stories and basement, 70 x 150 ft., costing about $70,0000. Inquiry is being made for shop tools and other equipment for delivery about April 1.

The Johannes Brothers Co., 118 South Washington Street, Green Bay, Wis., will build a six-story fireproof warehouse addition, 42 x 155 ft., and is buying spiral chute conveyors, monorail equipment, elevators, and additional refrigerating equipment. Construction bids are now being taken by Foeller, Schober & Stephenson, local architects. The estimated cost is $150,000.

The Northern Woodenware Co., Crandon, Wis., manufacturer of pails, boxes, crates and other wooden containers, is planning to rebuild immediately its main factory wrecked by fire recently. The investment will be about $75,000. Construction work will begin about April 1.

The Hohman-Nelson Co., Eau Claire, Wis., manufacturer of instruments for recording and controlling, time, temperature, fluids, vapors and gasses, has disposed of its entire business to the American Schaeffer & Budenberg Corporation, Brooklyn, N. Y. The Eau Claire company retains its machine shop and other equipment, and will make disposition locally.

Byrne Brothers, 31112 Burleigh Street, Milwaukee, have taken the general contract for the construction of a $60,000 public garage and service building, 105 x 120 ft., one story and part basement, at 1810-1820 North Avenue. The name of the owner and occupant is withheld for the present. It is estimated that $12,000 will be invested in machine shop tools, equipment, etc., which will be purchased in February or March.

The Auto Service Tool Co., Southern Milwaukee, Wis., recently incorporated with $25,000 capital, is equipping a shop for the production of special wrenches, tools and appliances. Inquiry is being made for a number of miscellaneous items. Lem E. Hendee is general manager.

Stanley F. Kadow, architect, 208 Howell Avenue, Milwaukee, is designing a factory building, 120 x 180 ft., for a client whose identity is unknown at present. It is stated that the site is on the south side of the city and the building will be used for manufacturing metal and wood products. The owner will not be ready to purchase equipment until spring.

The Anderson Motor Co., 36-38 West Second Street, Fond du Lac, Wis., has plans for a two-story garage and repair shop, 48 x 122 ft., work on which will be started about April 1. The cost is estimated at $40,000.

The Goelzer & Schultz Co., 740 Thirty-seventh Street, Milwaukee, is in the market for miscellaneous wood-working machinery, motors, etc., for an addition, 60 x 136 ft., at 818-824 Thirty-first Street.

Bids will be taken about Feb. 1 by the Board of Education, Kimberly, Wis., on a proposed $200,000 high school building, with vocational training shops.

Cincinnati

CINCINNATI, JAN. 21.

WHILE disappointment is expressed by some manufacturers over the volume of orders booked, there is every indication that buying will shortly take a spurt. The tendency has been to delay purchases until the general business situation has been more clearly defined, but with signs of confidence good buying is expected. Judged by the number of inquiries coming out each week, the machine tool industry looks for improvement over the past year.

Railroad buying is expected to be an important factor and automobile companies will probably purchase tools before very long.

During the week the Big Four Railroad took a number of tools for its Beech Grove and Bellefontaine shops and is expected to continue buying until its recent list is covered. The Ohio Knife Co., Cincinnati, completed its purchases last week, amounting to $25,000. The Ford Motor Co. was also a purchaser, but this really means that it specified a number of machines on a large order placed late last year. It will need equipment for several new assembling plants about to be built at Southern points.

The Clifton-Pratt Co., 1224 West Eighth Street, Cincinnati, is in the market for used belt-driven air compressors, 100 to 700 cu. ft. capacity. Full details are requested.

The Kentucky Utilities Co., Louisvills, Ky., has purchased the plant of the Lebanon, Ky., Light, Heat & Power Co., and will spend approximately $100,000 in improving the works and building transmission lines from the power plant at the new Dix River dam.

The plant of the McDermott Stone Co., at McDermott, Ohio, was practically destroyed by fire Jan. 14. It will be rebuilt at once, but whether it will be in the market for new machinery and power plant equipment will depend upon the condition of present equipment.

The Elam Paper Co., manufacturers of stationery, now located at Marion, Ind., and which will move to Dayton, Ohio, will occupy the former plant of the Bahmann Iron Works. Paper making machinery will be installed, and it

is probable that an addition will be built later. Virgil Schaefer represents the Elam Paper Co. in Dayton.

The Home Ice Co., Henderson, Ky., will rebuild the portion of its ice-manufacturing plant recently destroyed by fire with loss estimated at $40,000 including equipment.

The Tennessee Utilities Co., Inc., Waverly, Tenn., is planning for the construction of an ice-manufacturing and cold storage plant in connection with an expansion program during the year, including extensions to electric plant and system.

The Louisville Petroleum Refining Co., Louisville, recently organized, has commenced the construction of an oil refinery with an initial output of 2000 bbl. W. J. Caveney is construction engineer in charge.

The Liberty Brick & Tile Co., L. & C. Building, Nashville, Tenn., F. P. Bond, head, plans the installation of machinery and power equipment in local buildings for the manufacture of brick, tile and kindred products.

The Crane Enamelware Co., Chattanooga, Tenn., operated by the Crane Co., Chicago, has plans for an addition to its grinding department, Alton Park section, to double the present capacity.

The Ford Motor Co., Highland Park, Detroit, has awarded a general contract to the Blair Construction Co., Memphis, Tenn., for the erection of its assembly plant and power house, estimated to cost $1,000,000 with machinery.

The International Harvester Co., 606 South Michigan Avenue, Chicago, contemplates an addition to its branch plant at Memphis, Tenn., to cost about $50,000.

The Louisville & Nashville Railroad Co., Louisville, will commence the construction of a machine shop, 110 x 172 ft., at Etowah, Tenn., to cost $225,000 with equipment. W. H. Courtenay is chief engineer.

St. Louis

ST. LOUIS, Jan. 21.

THE Kansas & Texas Railroad Co., St. Louis, is arranging an appropriation of about $300,000, for extensions in its locomotive and car repair shops during the year, including additional equipment.

The Standard Gas & Electric Co., Oklahoma City, Okla., is disposing of a bond issue of $10,500,000, a portion of the proceeds to be used for extensions and additional equipment. Arthur S. Huey is vice-president.

A. A. Wagner, 901 Century Building, St. Louis, has plans for a two-story automobile service and repair works, 100 x 283 ft., on Delmar Street, estimated to cost $150,000 with machinery.

The Arkansas Oil Refinery, Fort Smith, Ark., operated by S. M. Newton, Tulsa, Okla., is planning for enlargements in its local refinery and the installation of considerable equipment.

Manual training equipment will be installed in the three-story high school to be erected at Bristow, Okla., estimated to cost $150,000, for which bids will be asked on a general contract early in February. C. Leo Curran, 222 Groom Building, is architect.

The Monol Window Glass Co., Fort Smith, Ark., is perfecting plans for the early rebuilding of its local plant recently destroyed by fire, with loss estimated at $200,000, including equipment. The re-construction will cost a like amount. C. P. Zenor is head.

The Springfield City Water Co., Springfield, Mo., will make extensions in its plant and install electrically operated pumping machinery. Bonds are being arranged.

The Central Petroleum Co., Sixth and Walker Streets, Kansas City, Mo., is planning the construction of a new oil storage and distributing works to cost close to $75,000 including equipment. E. W. Goebel is president.

Ovens, power equipment, conveying machinery and other equipment will be installed in the two-story and basement plant to be erected at Twenty-fifth and Madison Streets, Kansas City, Mo., by the Iten Biscuit Co., 1202 Capitol Avenue, Omaha, Neb., estimated to cost $140,000.

The Day Rubber Co., 415-17 North Fourth Street, St. Louis, has tentative plans for rebuilding the portion of its plant recently destroyed by fire with loss in excess of $100,000, including equipment

The Cement Securities Co., Denver, Colo., C. Boettcher, head, is negotiating for the purchase of the plant of the Monarch Cement Co., Humboldt, Kan. The purchasing company plans to extend the mill and install additional equipment.

The Batesville White Lime Co., Bethesda, Ark., formerly known as the Arkansas Lime Co., Ruddells, Ark., plans the construction of a power house as its proposed local plant, estimated to cost $125,000. The company has increased its capital from $100,000 to $300,000, for expansion.

Manual training equipment will be installed in the new high school to be erected at Spiro, Okla., estimated to cost $125,000, for which ground will be broken at an early date. Klingensmith, Haralson & Nelson, Fort Smith, Ark., are architects.

The Wood & Lane Co., 915 Olive Street, St. Louis, machinery dealer, has inquiries out for one 500 kw. engine-generator set, direct-connected to simple steam engine; one 100 kw. revolving field generator, direct-connected to Corliss type engine; one 300-kw., one-250 kw one-200 kw., and two 150-kw. motor-generator sets, direct-connected to self-starting motor, with switchboard and auxiliary equipment.

Cleveland

CLEVELAND, JAN. 21.

THE volume of orders and inquiries has improved and both dealers and manufacturers report a fairly satisfactory amount of business. Most of the business is for one or two machines and comes largely from the automobile field. Demand from this source is largely for machines to balance production or to replace old equipment with more modern tools. Automobile companies which bought additional equipment last fall and are now getting under production need a few machines to round out production units.

The Cleveland Windshield Co. has purchased six machines from a local dealer and some scattering orders are coming from Akron tire companies. Among new inquiries is one for 10 machines from a northern Ohio manufacturing company. The Timken Roller Bearing Co., Canton, is expected to be in the market shortly for equipment for plant extensions. The National Carbon Co. has not yet placed any orders against its recent list. No new inquiries are coming from the railroads.

Recent price advances on lathes and multiple spindle drilling machines by two Central Western manufacturers have brought out the fact that some machine tool builders are considering marking up quotations. It is pointed out that 1923 returns are not very satisfactory and to make a better showing this year there must be a marked increase in the volume of business or higher prices.

The Baker R & L Co., Cleveland, manufacturer of industrial trucks and automobile bodies, has purchased the plant of the Rubay Co., automobile body manufacturer, and will make some extensions, joining its No. 2 plant with that of the Rubay plant. The company plans to expend $100,000 in additions and the erection of dry kilns.

The C. O. Bartlett & Snow Co., Cleveland, manufacturer of handling, conveying and other lines of equipment, has sold its plant to Union Terminal interests, which required the site in connection with the building of the new Union passenger station. This sale will necessitate the erection of a new plant by the C. O. Bartlett & Snow Co., which has for some time had another building site. No definite plans have as yet been decided upon.

The General Power Construction Co., 1603 East Twenty-seventh Street, Cleveland, electrical contractor, has had plans prepared for a one-story factory and warehouse, 60 x 87 ft.

The Foster Bolt & Nut Co., Cleveland, will enlarge its factory by the erection of a basement structure, 36 x 228 ft. and on its completion plans to make further extensions. The Allen-Osborn Co., Rose Building, is the architect.

The Division of Agriculture, State of Ohio, will erect a two-story and basement brick and steel frame building, 229 x 363 ft., on the fair grounds at Columbus, Ohio. It will require steel sash and other lines of building equipment.

The Ashtabula Sheet Steel Co., Ashtabula, Ohio, will build a 72 x 170 ft. extension to its sheet mill at an estimated cost of $35,000.

The Cleveland Heater Co., 1900 West 112th Street, Cleveland, will build a one-story addition 50 x 100 ft. The George S. Rider Co., Century Building, is the architect and engineer.

The Cleveland Electric Illuminating Co. has completed preliminary plans for a substation at Shaker Heights. E. J. Cook, 801 Illuminating Building, is the engineer.

The Ohio Agricultural Experiment Station, Wooster, Ohio, will erect a $75,000 two-story and basement addition to its chemical laboratory. Herbert B. Briggs, Hartman Hotel, Columbus, is the architect.

The Building Products Co., Toledo, Ohio, has acquired a local factory for the manufacture of adjustable shores and kindred products, for which patents and rights have been purchased from the Hodges-Edelman Co., Cincinnati.

Detroit

DETROIT, Jan. 31.

BIDS will soon be asked for a three-story vocational and junior high school at Hamtramck, Mich., estimated to cost $570,000. J. C. Kastler & Co., Detroit Savings Bank Building, Detroit, are architects.

The Wolverine Casting Co., Kalamazoo, Mich., is perfecting plans for a new foundry at Plainwell, Mich.

The General Motors Corporation, General Motors Building, Detroit, has acquired the plant and business of the Armstrong Spring Co., Flint, Mich., and will operate it as the Armstrong spring division of the company. Plans are being considered for extensions. R. T. Armstrong, former head, will act as general manager.

The Collins Stamping & Mfg. Co., Detroit, manufacturer of electrical appliances, wireless equipment, etc., has tentative plans for the establishment of a new factory at Mount Pleasant, Mich., and the removal of the present works. Additional equipment will be required.

The Monroe Steel Casting Co., Monroe, Mich., is perfecting plans for a new foundry to replace the portion of its works recently destroyed by fire with loss of about $65,000 including equipment.

Manual training equipment will be installed in the three-story high school to be erected at Grand Rapids, Mich., estimated to cost $750,000, for which bids will be received on a general contract until Jan. 30. H. H. Turner, Michigan Trust Building, is architect. W. W. Bradfield, same address, is mechanical engineer.

Harry Zimmerman, Kalamazoo, Mich., associated with Jacob Kindleberger, head of the Kalamazoo Vegetable Parchment Co., is planning the organization of a new company to build and operate a paper mill, with reported cost of $250,000 including machinery.

The Great Lakes Power Co., Caro, Mich., is planning for extensions in its electric generating station and the installation of additional equipment.

A manual training department will be installed in the three-story high school to be erected at Algonac, Mich., estimated to cost $135,000, for which bids will be received on a general contract until Jan. 28. Warren M. Holmes, 430 Tussing Building, Lansing, Mich., is architect.

The Meister Corporation, Niles, Mich., recently organized, will operate a local plant for the manufacture of gasoline-propelled railroad cars and parts. H. E. Myers is president and general manager.

The Niles Steel Tank Co., Niles, Mich., has taken title to property heretofore known as the Niles Baseball Park, and will erect a one-story unit, 100 x 150 ft. Additional buildings will be constructed later. The present works will be removed to the new location.

Indiana

INDIANAPOLIS, Jan. 31.

TENTATIVE plans are being considered by the National Metal Molding Co., Fulton Building, Pittsburgh, for a new plant in the vicinity of Gary, Ind., with cost reported at $90,000. W. C. Robinson is president.

Fire, Jan. 11, destroyed a portion of the plant and power house of the Thiesing Veneer Co., Harding and McCarty Streets, Indianapolis, with loss estimated at $50,000 including machinery. It is planned to rebuild. Louis A. Thiesing is president.

The Interstate Public Service Co., Indianapolis, is arranging for a bond issue of $2,750,000 and stock issue of $695,000, the majority of the proceeds to be used for extensions and equipment. Harry Reid is president.

The Prince Motor Co., 1103 Jackson Street, Michigan City, Ind., representative for the Ford automobile, has plans for a two-story and basement service and repair building 100 x 125 ft., on Jefferson Street, to cost about $100,000 with equipment. Nicol, Scholer & Hoffman, Ross Building, Lafayette, Ind., are architects. L. S. Prince is president and general manager.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, will soon take bids for a two-story and basement factory branch, 160 x 204 ft., at Pratt Street and Senate Avenue, Indianapolis, to cost $200,000 with equipment. The Hunting-Davis Co., Century Building, Pittsburgh, is architect and engineer. L. C. McKinney is general manager.

The Overhead Door Co., Hartford City, Ind., has awarded a general contract to J. E. Clark, Hartford City, for a one-story plant to cost about $45,000, with equipment.

The Midwest Crushed Stone Quarries Co., Greencastle, Ind., will rebuild its stone crushing and distributing plant destroyed by fire Jan. 15 with loss estimated at $50,000 including equipment. All machinery will be electrically operated. E. B. Taylor is general manager.

The Southern Indiana Gas & Electric Co., Evansville, Ind., is planning for a note issue of $750,000, a portion of the proceeds to be used for extensions and additional equipment.

The Martin-Parry Corporation, York, Pa., manufacturer of automobile bodies, has acquired the plant and business of the Oakes Co., 3019 Roosevelt Avenue, Indianapolis manufacturer of metal stampings and other metal products. The new owner will continue the operation of the plant as a subsidiary. Extensions are under consideration.

South Atlantic States

BALTIMORE, Jan. 21.

H. H. WARNICK, 1108 Sixteenth Street, Washington, architect, has plans for a three-story automobile service and repair building, 109 x 145 ft., on Nineteenth Street, between M and N Streets, N. W., for M. Cafritz, 913 Fifteenth Street, and associates, to cost $210,000 with equipment.

D. C. Elphinstone, 408 Continental Building, Baltimore, machinery dealer, is in the market for one eight-wheel crane, bucket-handling type, with boom from 45 to 55 ft.; also for one stiff-leg derrick with swinger, about 5 tons capacity, including engine, two-drum type.

The Maryland Glass Corporation, Baltimore, has filed plans for a one-story plant on its 4-acre tract at Linden and Ontario Avenues.

The Columbus Electric & Power Co., Columbus, Ga., plans the construction of a hydroelectric generating plant near the Goat Rock Dam, about 15 miles from the city, with initial capacity of 25,000 hp., estimated to cost $500,000 with transmission system. R. M. Harding is general manager.

The Southern Railway Co., Washington, is said to be planning the construction of locomotive car repair shops at Spartanburg, S. C., to cost about $200,000 including equipment, replacing a works at Gadsden, Ala., recently destroyed by fire.

The R. S. Armstrong & Brother Co., Atlanta, Ga., machinery dealer, has inquiries out for one 300 kw. engine and generator; one or more 350 to 400 hp. watertube boilers; one 26-in. cabinet planer, Whitney type; one self-feed rip saw for handling 2 and 3-in. lumber; two electric hoists, each two or three drums, 220-volts, 60 cycle, and a number of 12 x 18 in. timber sizers, Woods type.

Work will commence on a one-story power plant at Forty-first Street and Green Spring Avenue, Baltimore, for the Children's Hospital and School, to cost about $42,000. Philip L. Goldsborough, Union Trust Building, is president. William G. Beech, 12 East Pleasant Street, is architect.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a company at Berlin, Germany, in the market for iron-working tools, woodworking equipment and engines, No. 8865; of a company at Bonacca, Honduras, desiring to purchase American band saws, No. 8816; a concern at Oaxaca, Mex., in the market for a steam shovel with traction mounting, No. 8846.

The Ford Motor Co., Highland Park, Detroit, has awarded contract to the McDevitt & Fleming Co., First National Bank Building, Chattanooga, Tenn., for its proposed assembling plant at Charlotte, N. C., one-story, 300 x 800 ft., with power house, 66 x 80 ft., to cost in excess of $600,000 with equipment.

Bids will be received by the State Highway Department, East Point, Ga., W. R. Neel, State highway engineer, until Feb. 1, for two gyratory crushers; bucket belt elevator; revolving sizing screen; revolving scalping screen and troughing belt conveyor, as per specifications on file.

The John A. Roebling's Sons Co., Trenton, N. J., is considering the purchase of two 10-ton trolley cranes for installation at its proposed wire rope and wire products factory branch, Walton Street, Atanta, Ga.

The Board of Trade, Bedford, Va., is interested in the organization of a local company and the construction of a plant for the manufacture of tires and other rubber products, to cost $80,000 with equipment.

Ovens, power equipment, conveying machinery, automatic wrapping and sealing machines, etc., will be installed in the two-story and basement plant to be erected by the Asheville Baking Co., Asheville, N. C., estimated to cost $100,000. Foundations will be laid at once. Roger A. Grant is president.

The Twin City Ice Co., White and Twelfth Streets, Winston-Salem, N. C., plans the purchase of two 100 hp. motors, 2300 volts, three phase, 60 cycles.

W. H. Allen, Elizabethtown, Va., and associates, have plans for the construction of a brick manufacturing and clay pro-

ducts plant, with power house at Marion, Va., estimated to cost $65,000.

The Georgia Railway & Power Co., Atlanta, Ga., is planning for an issue of $1,400,000, preferred stock, a portion of the proceeds to be used for hydroelectric power developments in the vicinity of Highlands, N. C. An expansion program for the current year has been arranged to cost $6,600,000, including plants and machinery.

The Hygeia Ice & Fuel Co., Spartanburg, S. C., contemplates enlargements in its ice-manufacturing plant and the installation of two electric-operated compressors, 300 and 200 hp., respectively; electric-driven air blower; metal brine tanks, etc. The present works will be electrified, replacing all steam-operated apparatus. The expansion will cost $100,000. W. R. Willauer is general manager.

Manual training equipment will be installed in the two-story high school to be erected at Thomasville, Ga., estimated to cost $140,000, for which bids will soon be asked on a general contract. A. Ten Eyck Brown, 717 Forsyth Building, Atlanta, Ga., is architect.

The Southern Power Co., Charlotte, N. C., is contemplating the construction of two electric generating plants at Duncan, S. C., and Rhodhiss, N. C. Both stations will have a rated capacity of 40,000 hp. each, with gross estimated cost placed at $5,000,000. W. H. Lee is chief engineer.

The Balfour Cotton Mills, Inc., Balfour, N. C., plans for the erection of a power house at its proposed plant, estimated to cost $200,000. Ellison A. Smythe, Greenville, S. C., is president.

The Blakely Hardwood Lumber Co., Blakely, Ga., has tentative plans for rebuilding the portion of its mill and power house recently destroyed by fire with loss estimated at $100,000, including equipment.

The United Railways Co., Baltimore, is arranging a fund of $1,750,000 for extensions and improvements during the year, a portion of the appropriation to be used for power plants and equipment. C. D. Emmons is president.

A power house will be constructed by the Planters Nut & Chocolate Co., Suffolk, Va., at its proposed local factory to cost about $350,000. The company will also establish a plant for the production of paper boxes, containers, etc.

The Fiber Mfg. Co., Newton, N. C., recently organized, has acquired the local Newton Asbestos Mill, and plans extensions and improvements, including additional equipment. Julius W. Abernethy is president; S. J. Smyer, Newton, is secretary.

The Common Council, Wilson, N. C., is having plans drawn for an addition to the municipal electric power house, to cost $180,000, for which bids will soon be called on a general contract. Gladding & Grantham, Wilson, are architects.

Gulf States

BIRMINGHAM, Jan. 21.

A TRACT of 60 acres at Baton Rouge, La., has been purchased by the Texas Chemical Co., Houston, Tex., as a site for a new plant to manufacture sulphuric acid and kindred products. It will include a one-story machine shop and power house and will cost approximately $750,000 with machinery.

The Florida-McCracken Concrete Pipe Co., Sanford, Fla., recently formed as a subsidiary of the McCracken Mfg. Co., Sioux City, Iowa, has purchased 6 acres for a new plant to manufacture concrete sewer pipe. It will be equipped for an initial output of 25,000 ft. per day. A power house will be built. The cost is estimated at $80,000 with equipment. The new company is headed by W. J. McCracken, and will operate with a capital of $300,000. C. D. Watson is plant superintendent.

The Sweetwater Cotton Oil Co, Sweetwater, Tex., has preliminary plans for rebuilding the portion of its mill destroyed by fire Jan. 8 with loss estimated at $45,000.

The Cheek-Neal Coffee Co., Nashville, Tenn., plans the construction of a can-manufacturing factory at its proposed new coffee roasting factory on East Bay Street, Jacksonville, Fla., recently acquired. A power house will also be built. The entire project will cost about $300,000 with machinery. Leon T. Cheek is vice-president and general manager.

The Houston Lighting & Power Co., Houston, Tex., is arranging a fund of about $3,500,000 for extensions in plant and system during the year. About $2,500,000 of the appropriation will be used for power plant construction and machinery.

Fire, Jan. 10, destroyed a portion of the refinery of the National Gasoline Co., Breckenridge, Tex., with loss estimated at $40,000. It will be rebuilt.

H. W. Dexter, Bisbee Building, Jacksonville, Fla., machinery dealer, is in the market for two 22 or 24-in. and one 18-in. slide valve, side crank stationary engine; also for a two line mechanical skidder and log loader for lumber mill service; and for two Mogul type locomotives, 10 wheels, 35 to 50 tons capacity.

The Gulf, Colorado & Santa Fe Railroad Co., Galveston, Tex., is planning for the installation of crushing machinery, conveying apparatus and other quarrying equipment at Brownwood, Tex. A power house will be built.

The Pinellas County Power Co., Bayboro, Fla., operated by the Engineering & Management Corporation, 165 Broadway, New York, has plans for the construction of a steam-operated electric generating plant on local site, estimated to cost $750,000. At a later date the capacity of the station will be increased to 22,000 kw. Byrd Latham is general manager.

The Southwestern Gas & Electric Co., Beaumont, Tex., is arranging an appropriation of $200,000 for extensions and the installation of additional equipment. Marshall T. Walker is vice-president.

Fire, Jan. 15, destroyed a portion of the oil refinery and adjoining plant property of the Texas Co., Port Arthur, Tex., with loss estimated at $650,000. It is planned to rebuild.

The Ford Motor Co., Detroit, has awarded a general contract to Irwin & Leighton, Philadelphia, for the erection of its assembling plant at Jacksonville, Fla. The main building will be one-story, 200 x 560 ft. A power house will be built. T. W. Roberts is local superintendent.

Vocational departments will be installed in the new three-story high school to be erected by the Caddo Parish School Board, Shreveport, La., estimated to cost $800,000, for which bids will be received on a general contract until Feb. 4. Edward F. Neild, 1206 Merchants Building, is architect.

The San Antonio Public Service Co., San Antonio, Tex., is disposing of a bond issue of $1,750,000, a portion of the proceeds to be used for extensions in connection with a 1924 expansion program, including additional equipment. Alanson P. Lathrop is vice-president.

The United States Engineer Office, Florence, Ala., will take bids until March 1 for four hydraulic turbines, each 35,000 hp. capacity, with governors.

The Decatur Cornice & Roofing Co., Albany, Ala., has inquiries out for the following equipment: One 5 to 10-ton electric traveling crane, 3-motors, 70 ft. span; one friction saw for handling 18 or 24-in. beams; one 500 cu. ft. belt-driven air compressor; two rivet forges, oil type; one rotary planer or structural and milling machine, 30 in. head; four 3-ton electric hoists, with plain trolleys, and two electric rivet heaters, 3-rivet capacity.

The Common Council, Lake Alfred, Fla., plans for the installation of electric-operated pumping machinery at the proposed municipal waterworks, for which a bond issue will soon be arranged.

The United States Engineer Office, Vicksburg, Miss., will take bids until Jan. 30 for two steel derricks, circular 24-133.

Pacific Coast

SAN FRANCISCO, Jan. 16.

CONTRACT has been let by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., to the Dinwiddie Construction Co., Crocker Building, San Francisco, for a three-story addition to its plant at Emeryville, Cal., to cost $300,000 with equipment.

The California Wire Co., Orange, Cal., has plans for a one-story addition to cost $17,000.

The United States Engineer Office, Portland, Ore., will take bids until Feb. 4, for two sand pumps, circular 24-641.

The United States Bureau of Public Roads, Vancouver, Wash., C. M. Cartwright, engineer, will commence the erection of a one-story machine shop, 65 x 100 ft., for road machinery and parts service.

The International Motor Co., 25 Broadway, New York, manufacturer of Mack motor trucks, has acquired a 3-acre site on Alameda Street, Los Angeles, for factory branch, one and two-stories, 270 x 960 ft., estimated to cost $300,000 with machinery.

The Seibel Air Spring Co., Hueneme, Cal., lately organized, has purchased property, heretofore held by the Berylwood Investment Co., for a new factory for which plans will be drawn at once. The main building will be one-story, 100 x 200 ft., estimated to cost $75,000.

The Washington Water Power Co., Spokane, Wash., is arranging a fund of $2,000,000, for extensions in its electric plants and system during the year, including additional equipment.

The Superintendent of Lighthouses, Ketchikan, Alaska, will receive bids until Feb. 12 for one gasoline hoist, 2 drum, derrick swinging gear, 30 hp.; and one stiff-leg derrick, for the Cape Spencer Light Station.

The Portland Pulp & Paper Co., 815 Broadway Building, Portland, Ore., recently organized, will take bids early in March for the erection of its mill on the Willamette River, estimated to cost $1,000,000 with machinery. It will include a power plant. R. R. Clark, Railway Exchange Building, is architect and engineer. Roy H. Mills is president.

The White-Smith Co., Los Angeles, is having plans drawn by Frank D. Chase, Inc., Title Insurance Building, for a one-story plant in the Central Manufacturing District, for the manufacture of furniture, 60 x 560 ft., with power house, estimated to cost $90,000.

Morris, Lockenbach & Pate, Wenatchee, Wash., are having plans drawn for a three-story cold storage plant, estimated to cost $150,000, in conjunction with fruit storage plant to cost a like amount. Morrison & Stimson, Wenatchee, are architects.

The Atchison, Topeka & Santa Fe Railway Co., Los Angeles, is arranging an appropriation of $2,500,000 for extensions and improvements in its locomotive and car repair shops at San Bernardino, Cal., during the year, including additional equipment.

The Pacific Gas & Electric Co., San Francisco, is arranging a program for hydroelectric power plant construction, additions to present generating plants, transmission lines, etc., calling for an expenditure of $50,000,000 during the next 36 months.

The Belcher Airplane Corporation, Watts, Cal., has negotiations under way for the purchase of local property as site for a new plant, with main unit, 200 x 400 ft., to cost approximately $85,000 with equipment.

The Long-Bell Lumber Co., Longview, Wash., will commence the construction of a power plant, estimated to cost $65,000 with equipment.

The Board of Education, Oakland, Cal., has acquired property at Twenty-fourth and Market Streets for the construction of new vocational shops. The present buildings at East Oakland will be abandoned and equipment removed to the new location, considerable additional machinery will be required.

Canada

TORONTO, JAN. 21.

MACHINE-tool business in this market has improved considerably since the first of the year and sales the past two weeks show that buyers are coming into the market for much needed equipment. The automotive industry has again resumed purchasing, and while orders are not extensive, inquiries are fairly large. Railroad equipment builders are making improvements to their plants and are buying for replacement purposes. Other lines of industry are also showing improved interest in the machine tool market.

The MacKinnon Steel Co., Sherbrooke, Que., is having plans prepared by its own architect for the erection of a new plant in Montreal. It is the intention of the company to call for bids next spring in connection with the concrete work. Bids are being received for a traveling crane or locomotive crane.

The Hoover Suction Sweeper Co., Hamilton, Ont., is arranging for the erection of an addition to its plant on Gage Avenue North.

The London, Ont., Utilities Commission is having plans prepared for three new hydro sub-stations.

The John E. Russell Co., Ltd., Harbor Administration Building, Toronto, is in the market for two second hand 30-ton saddle tank locomotives.

The Bell Thread Co., Hamilton, Ont., will purchase one 2-in. or 4-in. power pipe cutter and threader.

The Ford-Smith Machine Co., Hamilton, Ont., is asking for a used scleroscope, also Brinell hardness testing machine.

The Regal Kitchens, Ltd., 85 Park Avenue, Montreal, is in the market for circular shears for cutting disks out of copper sheets, iron, etc.

Colin Clarke, P. O. Box 752, Kirkland Lake, Ont., is in the market for one woodworking machine, one buzz planer, one double surface planer, one self-feed rip saw, one trim saw, one mortiser, one horizontal borer and one shaper.

The Ives Bedding Co., Ltd., Cornwall, Ont., is in the market for an inclinable power press, not geared, similar to Brown & Boggs No. 14.

The Empire Brass Mfg. Co., London, Ont., is in the market for Nos. 1, 2 and 3 manufacturers' equipment collapsible taps; also pipe threading or bolt threading machine, single head capacity up to ¾-in. Geometric make preferred.

The St. Maurice Paper Co., Cap de la Madeleine, Que., is having plans prepared for a machine room in connection with its plant to cost $50,000. G. A. Slater is engineer in charge.

E. Scott, 734 St. Paul Street West, Montreal, is in the market for a boring machine.

J. W. Cummings & Co., New Glasgow, N. S., are receiving prices on foundry equipment. H. S. Cameron is purchasing agent

The Willis Piano Co., St. Therese de Blainville, Que., proposes to build an addition to its factory and is in the market for equipment. W. D. Willis is purchasing agent.

The International Nickel Co., Copper Cliff, Ont., contemplates the erection of a sintering plant next spring to cost $300,000.

The Consolidated West Dome Lake Mines, G. H. Manton, 420 Bank of Hamilton Building, Toronto, Ont., purchasing agent, is in the market for pumps.

The Seaman Kent Co., 268 Wallace Avenue, Toronto, Ont., is in the market for planers, jointers, tenoning machines, saws, lathes, etc., in connection with a $250,000 planing mill and woodworking factory to be erected at Renfrew, Ont. Some equipment has been purchased and the company is now in the market for the remainder of its requirements.

The Bickle Fire Engine Co., Woodstock, Ont., proposes to start work soon on the erection of a new factory, 45 x 200 ft., of brick construction. The company has options on several sites, but has not yet decided on the location. It has recently taken preliminary steps toward the incorporation of the Bickle Fire Engines, Ltd., with a capital stock of $200,000. R. S. and W. R. Bickle are the two partners.

The J. P. Porter Co., Hamilton, Ont., has been formed to manufacture patent fuel from coal screenings and asphalt fuel oil It has leased a five-acre site from the Canadian National Railways at Hamilton and will spend about $150,000 on the erection of a plant. J. P. Porter and H. L. Ferry are associated in the organization of the company.

The Canada Wood Specialty Co., Ltd., Orillia, Ont., is completing arrangements for a new factory this year. It will be 200 x 300 ft. and will manufacture flooring, plain and enameled handles, spools, bobbins, etc. J. J. B. Tudhope is president; W. Thompson, vice-president, and W. D. Mott, secretary-treasurer and manager.

The R. A. Smart Co., Ltd., Winnipeg, Man., manufacturer of grain loaders, farm implements, etc., will rebuild its factory which was destroyed by fire last September.

The Yarmouth Cold Storage Co., Yarmouth, N. S., is in the market for equipment for a $75,000 cold storage plant. A. W. Eakins, care of Parker-Eakins Co., is purchasing agent.

STEEL AND INDUSTRIAL STOCKS

The range of prices on active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	46¾	50¼	Midvale Steel ..	29⅝	30⅛
Allis-Chal. pf...	95	96¾	Nat.-Acme	9⅜	9⅞
Am. Can 105⅝		108⅛	Nat. En. & Stm.	41⅛	44⅞
Am. Can pf.....109¾		111¾	Nat. En. & S. pf.	89	89
Am. Car & Fdy.	163	163	N. Y. Air Brake	39¼	43⅝
Am. C. & F. pf.	119	121	Nova Scotia Stl.	14½	14½
Am. Locomotive.	73	74¼	Otis Steel	9¾	10⅞
Am. Loco. pf...118½		118½	Otis Steel pf....	57	58
Am. Radiator...	94½	99½	Pressed Stl. Car	53	56
Am. Steel Fdries.	37½	38¼	Railway Stl. Sp.	107½	109¾
Am. Stl. Fd. pf..	103	103¼	Replogle Steel ..	11¾	13⅞
Bald. Loco. 121½		126⅛	Republic	51	55
Beth. Steel	53¾	56	Republic pf.	89¾	91
Beth. Stl. 7% pf.	91½	93	Sloss-Sheffield ..	58	62
Br. Em. Stl. 2 pf.	13⅜	15⅝	Steel of Canada..	67	76¾
Chic. Pneu. Tool	83	84	Superior Steel...	33¾	33⅞
Colo. Fuel	25¼	27	Transue-Wms. ..	34¼	35⅛
Deere pf.	73	74⅞	Un. Alloy Steel..	32⅜	34
Gen. Electric ...196		204¾	U. S. Pipe.....	66¼	78⅝
Gt. No. Ore Cert.	28	29¼	U. S. Pipe pf....	81⅞	86⅛
Gulf States Steel	80¼	84½	U. S. Steel.....	98⅝	101⅝
Inland	36	37⅜	U. S. Steel pf...120		120½
Int. Har.	83½	86	Vanadium Steel.	29⅝	31⅜
Int. Har. pf....107		107¾	W'house Air Br.	85½	96
Jones & L'lin pf.	109	109	Y'gstown S. & T.	68	69
Lima Loco.	65½	67¼			

Gross sales of the New York Air Brake Co. in 1923 exceeded $10,000,000, against $6,711,462 in the previous year, and net earnings after charges, excepting taxes, were approximately $3,000,000, as indicated by preliminary figures. The company went into 1924 with more than $8,000,000 working capital, against $5,588,156 in 1922. December earnings exceeded the average for 1923, having been more than $265,000.

Plans of New Companies

The Sanford-Day Iron Works, Inc., has been organized with capital stock of $480,000 under Delaware laws, to manufacture iron and steel products, having taken over the business and plant of the Sanford-Day Iron Works of Knoxville, Tenn., with branches at Birmingham, Ala., Denver, Pittsburgh and Huntington, W. Va.

The Electric Maintenance Service Co., 171-75 Cannon Street, Bridgeport, Conn., has beeen incorporated with capital stock of $50,000 to operate an electric motor repair business, having taken over a company established in this line five years. It will also buy and sell new and used motors or any electric equipment. Walter N. Burr heads the company.

The Baltimore Commercial Body Corporation, 920-28 South Eutaw Street, Baltimore, Md., has been organized to act as distributor of commercial bodies and motor truck accessories. Jesse B. K. Lee is president.

The Hunt Mfg. Co., 103 Mercer Street and 104 Water Street, Baltimore, Md., has been organized with capital stock of $100,000 to manufacture metal specialties, to do general machine work and to make special machinery. It recently purchased the plant of the Mergenthaler Co., completely equipped, and has another plant owned by the interests involved. William J. Hunt is president; Lawrence J. Hunt vice-president, and Adam A. Kreis, secretary-treasurer.

The Universal Bumper Co., 509 South Fourth Street, Minneapolis, Minn., has been incorporated with capital stock of $50,000 to manufacture a combination bumper and fender-brace for Ford cars. All work will be contracted for with the Rao Mfg. Co., Minneapolis. P. C. Engel is president; P. H. Purcell, secretary-treasurer, and H. B. Foster, vice-president.

The Marion Forged Products Co., Marion, Ind., has been organized with capital stock of $40,000 and will manufacture drop forgings. It has purchased all holdings, including plant, of the Western Drop Forge Co. and will begin operations about Feb. 1 on carbon, alloy and other castings, also wrenches, chain pipe vises, hooks, clamps, etc. It is possible that equipment may be needed later on, when production begins on the small tool line. The officers are: Frank W. Trabold, president; Robert W. Batton, vice-president; J Mack Wilson, secretary, and Fred W. Davis, treasurer.

The Pitz Foundry, Inc., Waterbury and Scholes Streets, Brooklyn, incorporated with capital stock of $300,000, has purchased the plant of the Pitz Foundry & Pattern Works, 288 Scholes Street, Brooklyn, and will manufacture castings in gray iron, steel, malleable, brass and aluminum. Machinery and equipment are sufficient for the present. The officers are John F. Pitz, president and general manager; John F. Pitz, Jr., secretary-treasurer, and Robert G. Pitz, vice-president.

The Savage Deremer Corporation, New York, has been incorporated with 1000 shares of stock, no par value, to manufacture vacuum pumps and pumping machinery. Details of manufacturing will not be taken up before three or four weeks, during which time all efforts will be turned to matters of organization. Address in care of Pendleton, Anderson, Iselin & Riggs, 25 Broad Street.

The Universal Rotary Pump Corporation, Brooklyn, has been incorporated with $20,000 capital stock to manufacture pumping machinery. The company is only in the formative stage, but manufacturing will eventually be taken up. Incorporators are S. H. Roberts, E. J. McCormick and C. W. Zobel. Address in care of Lewis & McNamara, 322 Ninth Street.

The Perfect Razor Blade Stropper Co., New York, has been incorporated with $50,000 capital stock to manufacture razor blades and accessory equipment. Information regarding future plans may be obtained by addressing G. I. Hovey, 21 Madison Avenue, Montclair, N. J.

The L. & S. Iron Works, Inc., 16 Union Avenue, Brooklyn, has been incorporated with nominal capital to manufacture fire escapes and to operate a general iron works. The company is now active on a small scale. Incorporators are S Shankin and Bernard Budnick, 220 Fifth Avenue, New York.

The Scale & Machinery Service, 718 Greenwich Street, New York, has been organized with nominal capital to manufacture weighing machinery and parts. Plans are not definitely known. W. J. Beck, P. F. Wasserman and C. W Humble are the incorporators.

The Electric Tool Kit Co., New York, has been incorporated with 100 shares of no par value stock to manufacture electric tool kits and tools. Manufacturing will eventually be undertaken, but plans are indefinite and no specific date can be set. Address is in care of May Patterson, 350 Fulton Street, Brooklyn.

Becker's Auto Body Co., Brooklyn, incorporated with capital stock of $10,000, will operate a repair and upholstering shop for automobile bodies. W. E. Glitt and J. and L. Becker are the incorporators.

Johnson Motor Products, Inc., 518-22 West Fifty-seventh Street, New York, recently incorporated with capital stock of $100,000, will manufacture marine motors. The company owns and leases plants in New York and Eddystone. Manufacturing will be done by contract. H. A. Johnson is president; P. J. Holdsworth, vice-president; E. Griffin, secretary, and E. P. Morse, Jr., director.

The Concrete Metal Molds Co., 110-12 West Forty-second Street, New York, has been incorporated with capital stock of $25,000 to manufacture combination steel molds for pouring concrete. The company's plant is located at Carlisle, Pa., and other requirements have been contracted for with the Brewer Titchener Corporation, Binghamton, N. Y.

Brown's Metal Weather Strip Co., 101 Pennsylvania Avenue, Newark, N. J., has been organized to do a general metal weather stripping business on industrial and residential buildings. C. R. Brown heads the company.

The Columbus Handle & Tool Corporation, Columbus, Ind., has been incorporated with $52,500 capital stock to manufacture logging and ice tools, having taken over the Columbus Handle & Tool Co., which is now in process of dissolution. H. Lee Bassett is president; W. F. Bassett, vice-president, and H. W. Bassett, secretary.

The Maybey Electric & Mfg. Co., Indianapolis, has been incorporated with capital of $50,000 to manufacture electrical heating devices, having acquired a business with plant and equipment, fully established in this line. Charles W. Maybey is president and William E. Munk, secretary-treasurer.

The Cutler Hardware Co., Waterloo, Iowa, recently incorporated with $500,000 capital stock, is identified with the company by that name, which has been active for about 30 years as wholesale jobber. The only change effected by the incorporation is an increase in capital. G. W. Huntley is president.

The Acme Pattern Works, 77 Seeley Avenue, Arlington, N. J., has been organized to manufacture metal patterns. It has leased the Watts Campbell Pattern Shop at 287 Passaic Street and has complete equipment. Emil Thelin is president.

The Howard Automobile Co., San Francisco, incorporated with capital stock of $2,000,000 under Indiana laws will take over the business by that name at Van Ness Avenue and California Street, engaged in automobile distribution on a large scale. Offices are maintained in Portland, Ore., and Oakland, Cal. Incorporators are: Robert D Lipman, Henry D. Costigan and J. D. Adams.

The Elastoid Fiber Co., Waltham, Mass., has been organized to manufacture electric insulating and textile tubes, also tubes for protecting shoulders, screw threads, points, etc. N. Marshall heads the company.

The Bay State Forge Co., Highland Station, Springfield, Mass., has been organized to manufacture drop forgings, and to do heat treating and die sinking work. It has complete equipment for this work and is ready to make prompt deliveries. J. H. G. Williams is general manager.

The Metallurgical Service Co., 405 Mercantile Library Building, Cincinnati, has been organized by N. M. Salkover to sell a complete line of metallurgical equipment and supplies. Mr. Salkover is a graduate of the University of Cincinnati and previously was employed as metallurgist by the R. K. Le Blond Machine Tool Co.

The National Type Foundry Co., Inc., has been organized with capital stock of $500,000 to manufacture printers' type. Plans are not sufficiently along to permit a detailed announcement. William J. Platt is president. Address is in care of the Colonial Charter Co., Ford Building, Wilmington, Del.

The Lloyd Electric Co., 1010 Hawthorne Avenue, Minneapolis, Minn., has been organized to operate a general electric contracting and supply business, handling electrical fixtures, appliances and allied lines. Joseph C. Lloyd is president and George H. Carlson, secretary-treasurer.

The Nolan Truck Co., Inc., Okay, Okla., has been incorporated with $6,000,000 capital stock under Delaware laws, to manufacture motor trucks, trailers and bodies. The company has a good sized plant now in full operation. No additions are contemplated at the present. The officers are William H. Nolan, president; H. A. Stroud, vice-president, and D. L. Jones, secretary-treasurer.

John K. Green, Inc., New York, has been organized to manufacture window attachments and accessories. Operations are now under way. E. D. Green is president and treasurer, and E. N. Brandt, secretary. Address is in care of Osborne & Ettinger, 149 Broadway.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates

	Per Lb.
Bars:	
Refined iron bars, base price	3.54c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger base	3.64c.
Channels, angles and tees under 3 in. x ¼ in., base	3.54c.
Steel plates, ¼ in. and heavier	3.64c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.10c.
Toe-calk, ½ x ⅜ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth, spring steel	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c.
Squares, flats and hex	4.90c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.34c.
No. 12	4.39c.
No. 14	4.44c.
No. 16	4.54c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.40c. to 4.70c.	.....
Nos. 22 and 24	4.45c. to 4.85c.	5.10c.
No. 26	4.50c. to 4.90c.	5.15c.
No. 28*	4.60c. to 5.00c.	5.25c.
No. 30	4.80c. to 5.20c.	.....

Galvanized

	Per Lb.
No. 14	4.70c. to 5.10c.
No. 16	4.85c. to 5.25c.
Nos. 18 and 20	5.00c. to 5.40c.
Nos. 22 and 24	5.15c. to 5.55c.
No. 26	5.30c. to 5.70c.
No. 28*	5.60c. to 6.00c.
No. 30	6.05c. to 6.45c.

*No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	—41	—24	½ in. Butt	— 4	+19
¾ in. Butt	—46	—32	¾ in. Butt	—11	+ 9
1-3 in. Butt	—48	—34	1-1½ in. Butt	—11	+ 6
2½-6 in. Lap	—44	—30	2 in. Lap	— 5	+14
7-8 in. Lap	—41	—11	2½-6 in. Lap	— 9	+ 9
9-12 in. Lap	—34	— 6	7-12 in. Lap	— 3	+16

Bolts and Screws

Machine bolts, cut thread, 45 and 10 to 50 and 10 per cent off list

Carriage bolts, cut thread, 35 to 35 and 10 per cent off list

Coach screws.....45 to 50 and 10 per cent off list

Wood screws, flat head iron, 75, 20, 10 and 7½ per cent off list

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¼c. to 18¼c.
High brass wire	17¾c. to 18¾c.
Brass rods	15 c. to 16 c.
Brass tube, brazed	25¼c. to 26¾c.
Brass tube, seamless	21½c. to 22½c.
Copper tube, seamless	22½c. to 23½c.

Copper Sheets

Sheet copper, hot rolled, 20 to 20½c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Bright Tin Grade "A" Charcoal 14x20	Coke—14 x 20	Prime	Seconds
		80 lb.	$6.55	$6.30
		90 lb.	6.65	6.40
		100 lb.	6.75	6.50
IC	$12.55	IC	7.00	6.75
IX	13.95	IX	8.25	8.00
IXX	15.55	IXX	9.50	9.25
IXXX	17.10	IXXX	10.75	10.50
IXXXX	18.85	IXXXX	12.00	10.75

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits pig	52c.
Bar	60c. to 62c.

Copper

Lake ingot	15½c.
Electrolytic	15 c.
Casting	14 c.

Spelter and Sheet Zinc

Western spelter	7¾c.
Sheet zinc, No. 9 base, casks	10¾c. open 11½c.

Lead and Solder*

American pig lead	9½c. to 9¾c.
Bar lead	12c. to 13c.
Solder ½ and ½ guaranteed	35¾c.
No. 1 solder	33¾c.
Refined solder	29¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c. to 90c.
Commercial grade, per lb	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	12½c. to 13c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	36c.

Old Metals

The market continues quiet and sluggish. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	11.00
Copper, heavy wire	10.25
Copper, light bottoms	9.00
Brass, heavy	6.00
Brass, light	4.75
Heavy machine composition	8.75
No. 1 yellow brass turnings	6.00
No. 1 red brass or composition turnings	7.75
Lead, heavy	6.75
Lead, tea	5.75
Zinc	4.00
Cast aluminum	16.50
Sheet aluminum	16.50